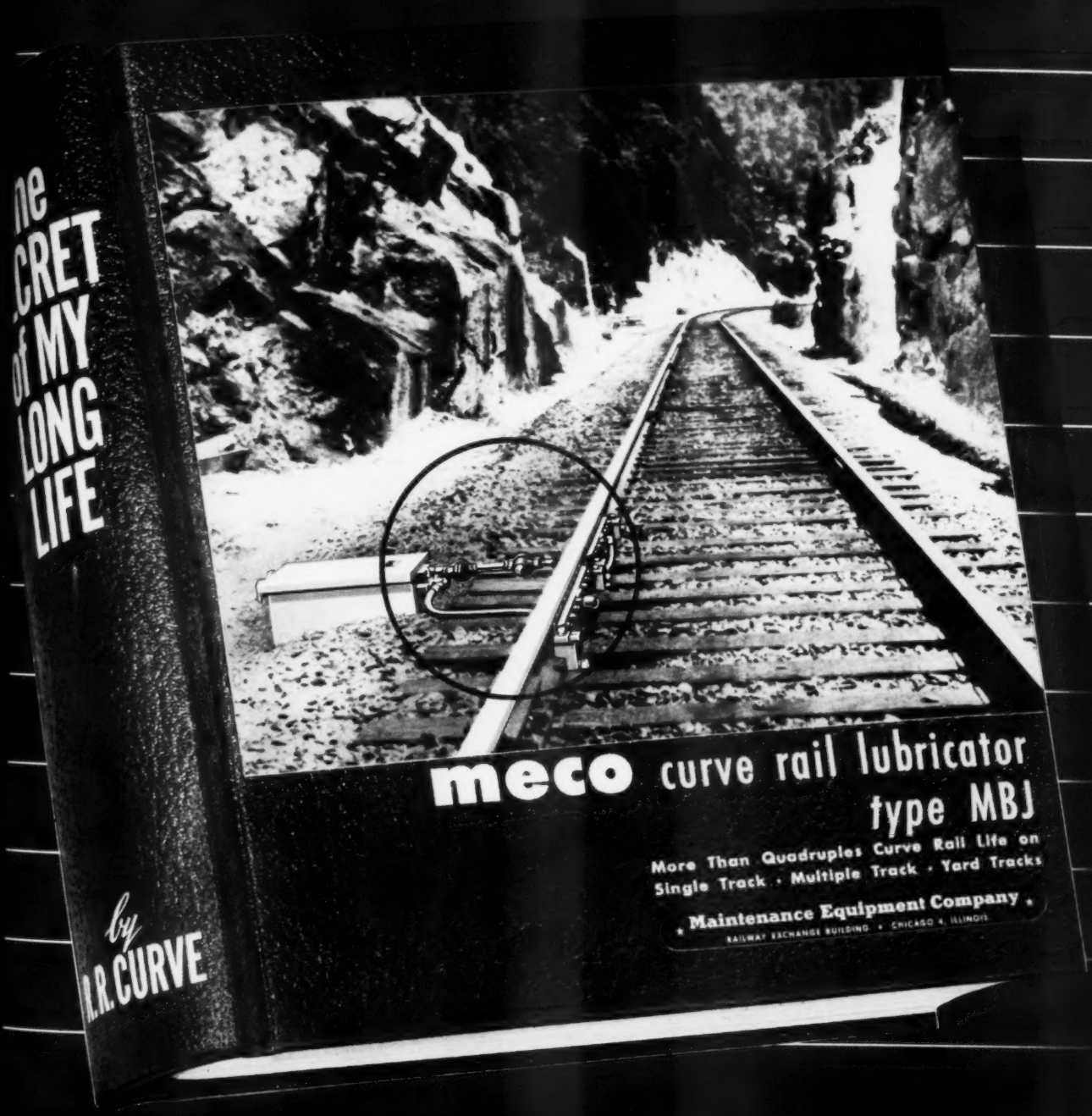
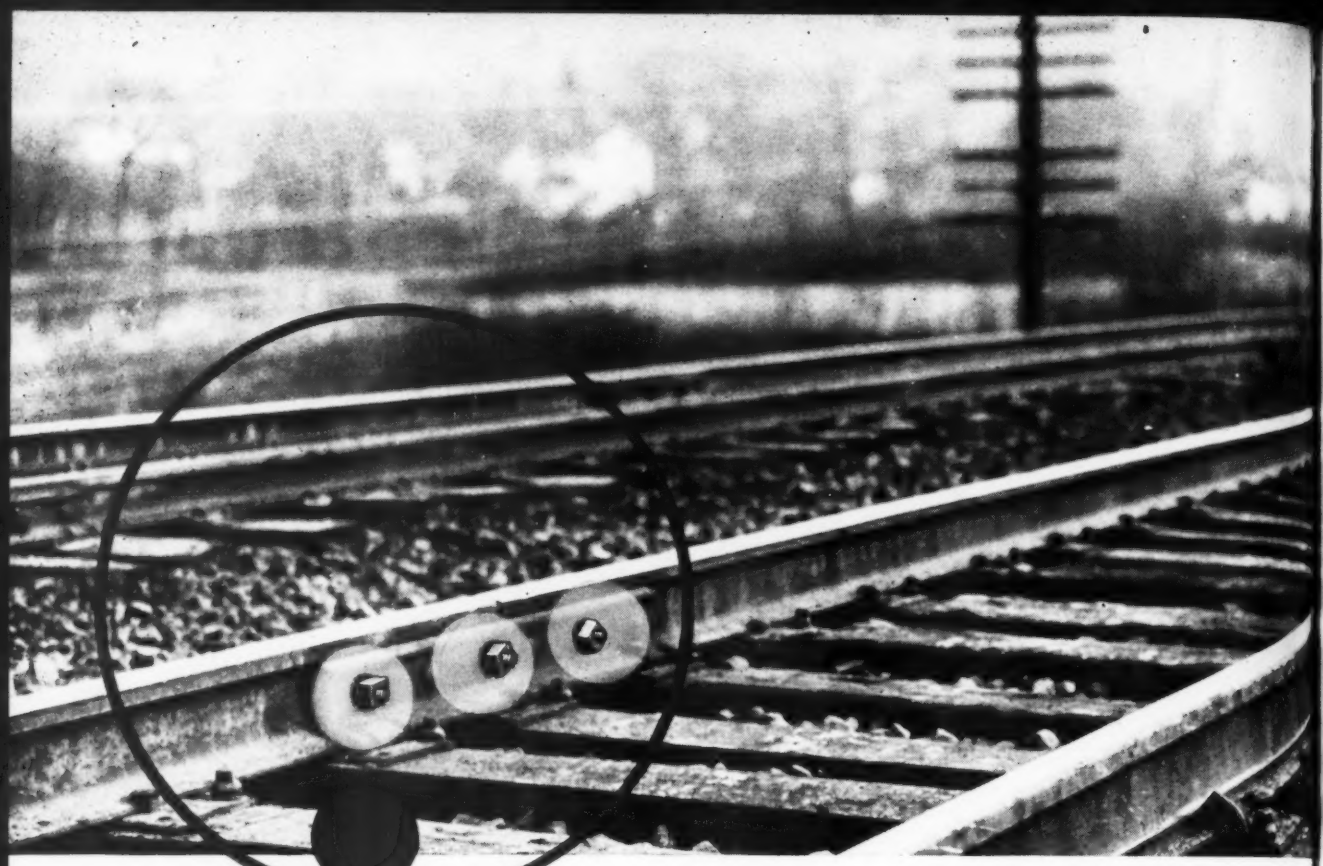
Railroad Engineering and Maintenance
JUNE, 1950





smoother riding track

Reliance Hy-Pressure Hy-Crome Spring Washers contribute to smoother riding track by maintaining rail joint bolts under proper tension, thus improving track-joint and rail-end conditions.

Your new rail laying program can go through on schedule if Reliance Hy-Pressure Hy-Crome Spring Washers are specified and used on track-joint bolts. Dependable and prompt delivery service of Reliance Hy-Pressure Hy-Crome Spring Washers backed by adequate inventories and prompt experienced personnel, will not hold up your laying gangs and create unnecessary expense and delay.

WRITE for Railroad Track Folder showing the many spring washers of the Hy-Crome family used on track and track accessories.

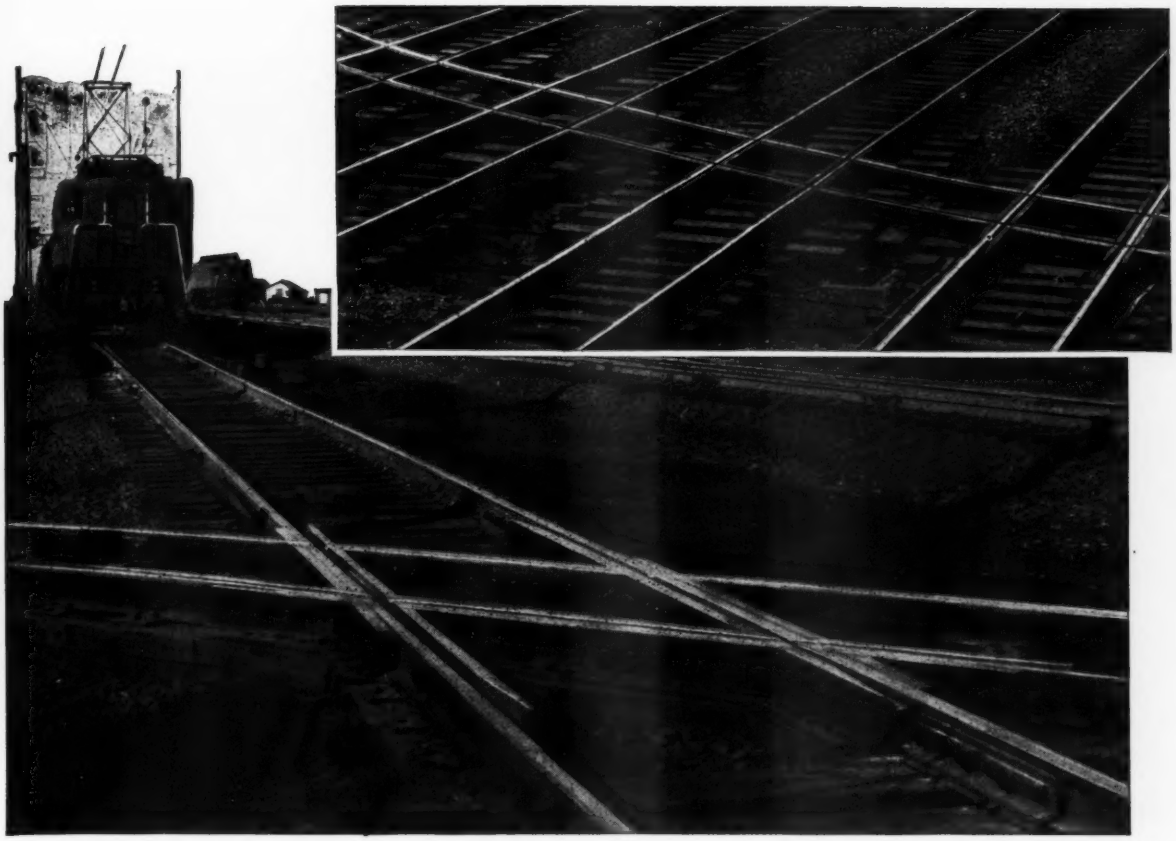
Reliance **HY-PRESSURE HY-CROME** *spring washers*

EATON

EATON MANUFACTURING COMPANY

RELIANCE DIVISION
Office and plant MASSILLON, OHIO

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal



A BETHLEHEM *BOLTED, HEAT-TREATED* CROSSING

is a long-term investment

In 1931, when we introduced the Bethlehem bolted, heat-treated crossing, we were confident that we had something. We'd spent a long time developing a crossing that, in our opinion, would be the most rugged type ever offered.

Now, nineteen years later, we have lots of backers in that opinion. Hundreds of these crossings are in use throughout the country, many of which have been in heavy-duty service for years. They've proved amazingly durable under the constant pounding of high-speed, main-line traffic.

Durability is literally built into a Bethlehem bolted crossing. All parts are of forged or rolled steel, and after a unit has been assembled, it is carefully heat-treated. Then the crossing is dismantled, shot-blasted to remove scale, and reassembled with high-tensile alloy bolts. The finished job is hardened throughout the entire section; is highly resistant to wear, chipping, and spalling.

Further details are available whenever you wish them. Bethlehem engineers will be glad to work closely with you on two- or three-rail designs to your own or A.R.E.A. standards.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

Published monthly by Simmons-Boardman Publishing Corporation, 79 W. Monroe St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Marion, Ind., post office. Address communications to 79 W. Monroe St., Chicago 3, Ill. Volume 46, No. 6.

From the Record

(AS SUPPLIED BY ONE OF THE LEADING RAILROADS)

JACKSON
MULTIPLE TAMPERS

SAVED $221,809 ON 363 MILES OF TRACK

●

PUT UP TRACK TWICE AS FAST AS COULD BE DONE WITH HAND TAMPING

●

PRODUCED FINISHED WORK FAR SUPERIOR IN QUALITY AND DURABILITY TO THAT ATTAINED WITH HAND TAMPERS – DUE TO THE GREATER UNIFORMITY

●

PAID FOR THEMSELVES IN A SINGLE SEASON

These results were achieved under what we believe were no better than average conditions, and constitute a conservative yardstick with which any maintenance chief can measure the potential benefits of using this universally successful tamper. Drop us a line for descriptive literature or an across-the-desk discussion with a thoroughly practical field engineer.

ELECTRIC TAMPER & EQUIPMENT COMPANY

LUDINGTON MICHIGAN

CRAWLERS plus POWER

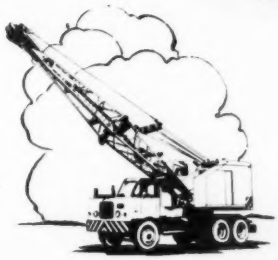
. . . for the heart of the TOUGH JOBS!

Here is real crawler power and engine power — the kind you need in the varied conditions met in railroad work. Ability to negotiate this 30° grade saved a *three mile trip* and you know what that means in time and money.

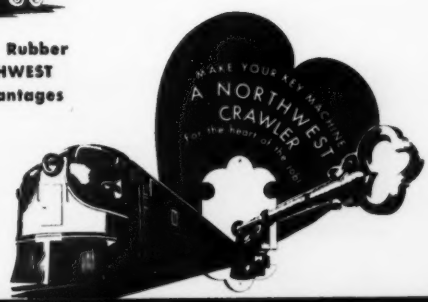
Northwest Shovels, Cranes and Draglines have the tractive force railroad work requires. Northwest Steering with positive traction on both crawler belts while turning as well as when going straight ahead eliminates the loss of tractive effort on the curves in negotiating off-the-line conditions, work on run-off ditches, bank trimming and building out shoulders.

From its easy control through the "Feather-Touch" Clutch Control to the Northwest Crawlers it is a railroad rig. Northwest *steering* and Northwest *power* will mean hours of time saved in those Key Spots. Plan ahead to have a Northwest. Ask for complete details.

NORTHWEST ENGINEERING CO.
1513 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois



If you want it on Rubber
ask about NORTHWEST
TRUCK CRANE Advantages



NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE

Simplify Maintenance Problems! Control Brush · Weeds · Grass with

PHOTO COURTESY OF SPRAY SERVICES, INC.

DOW WEED KILLERS

Dow research supplies the answer to *your* problems of vegetation control in ballasts, along right-of-ways and under bridges and culverts. Tests over a period of many years in cooperation with leading railroads and service organizations have enabled Dow to produce a complete line of proved chemicals to combat nearly every type of troublesome vegetation on the average right-of-way. Today, the use of Dow brush, weed and grass control products is cutting costs from 25% to as high as 50% over laborious hand-cutting methods.

Dow sales and technical men are eager to cooperate with *you* on your vegetation control problems. Your inquiry addressed to Dept. 663, The Dow Chemical Company, Midland, Michigan will receive prompt attention.

ESTERON BRUSH KILLER containing equal amounts of esters of 2,4-D and 2,4,5-T controls woody plants including alder, birch, brambles, cherry, elm, hickory, oaks, osage orange, poison ivy, sumac, willow, and many other species. Assures satisfactory control of most troublesome species on the average right-of-way. Also effective in treating stubs and stumps to control resprouting.

ESTERON 245 controls woody plants in the same manner as Esteron Brush Killer. It is particularly effective on 2,4-D resistant species such as brambles, hawthorn, mesquite, osage orange and poison ivy. Also very promising for stump treatment and dormant bark application.

2-4 DOW WEED KILLER, FORMULA 40 is effective against herbaceous weeds. Can be used with Sodium TCA 90% to obtain control of both weeds and grass.

SODIUM TCA 90% controls Johnson, quack and Bermuda and other grasses. At lower dosages, it retards growth without killing, where a light grass cover is desired.

Agricultural Chemical Division

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

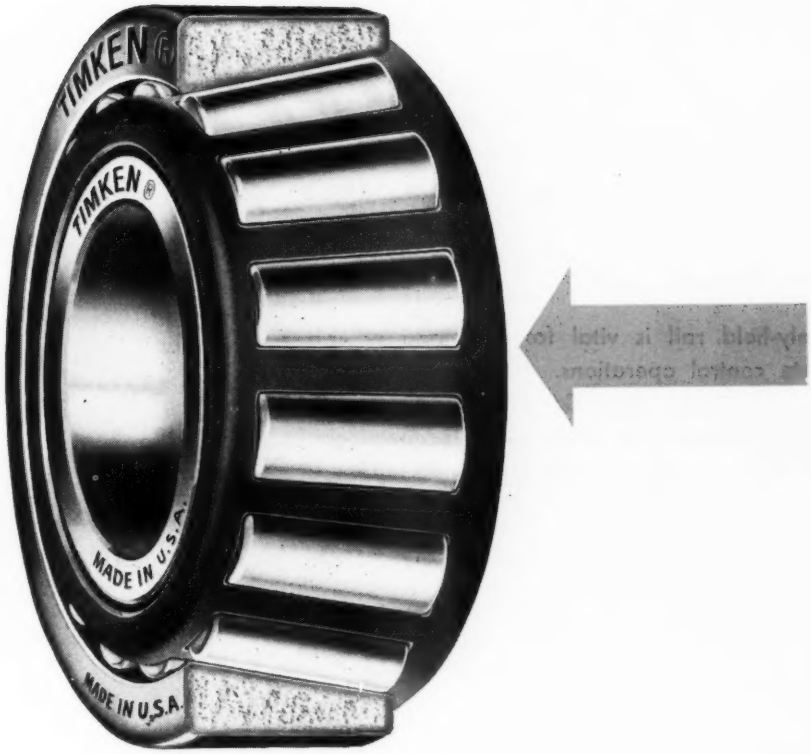
DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE

USE DEPENDABLE DOW AGRICULTURAL CHEMICAL PRODUCTS

WEED AND GRASS KILLERS • INSECTICIDES • FUNGICIDES
SEED PROTECTANT • PLANT GROWTH REGULATORS
GRAIN AND SOIL FUMIGANTS • WOOD PRESERVATIVE



How TIMKEN® bearings take an extra load off your mind

MOST bearings carry radial loads *only* with extra bearings or washers needed to handle thrust loads. But not with Timken® bearings! Due to their tapered construction, Timken bearings take *both* radial and thrust loads in any combination. Your designs can be simplified, space saved.

Friction is all but eliminated with Timken bearings due to their true rolling motion and incredibly smooth surfaces. Line contact between rolls and races provides greater load-carrying capacity, extra precision. Shafts are held rigid, preventing wobble, deflection or end-movement.

Timken bearings are made from the finest steel ever developed for tapered roller bearings . . . Timken fine alloy steel. They normally last the life of the machine in which they are used.

Remember that Timken bearings in your product add a valuable sales feature. They build greater acceptance for your product among customers. So always look for the trade-mark "Timken" on the bearings you buy. And when buying new machinery, be sure it's Timken bearing equipped. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▱ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION ✳

Compression Rail Anchors

Closely-held rail is vital for CTC and other remote control operations. That's why, more and more, you find Compression two-way holding safeguarding the efficient, economical operation of these important installations.

THE RAILS COMPANY

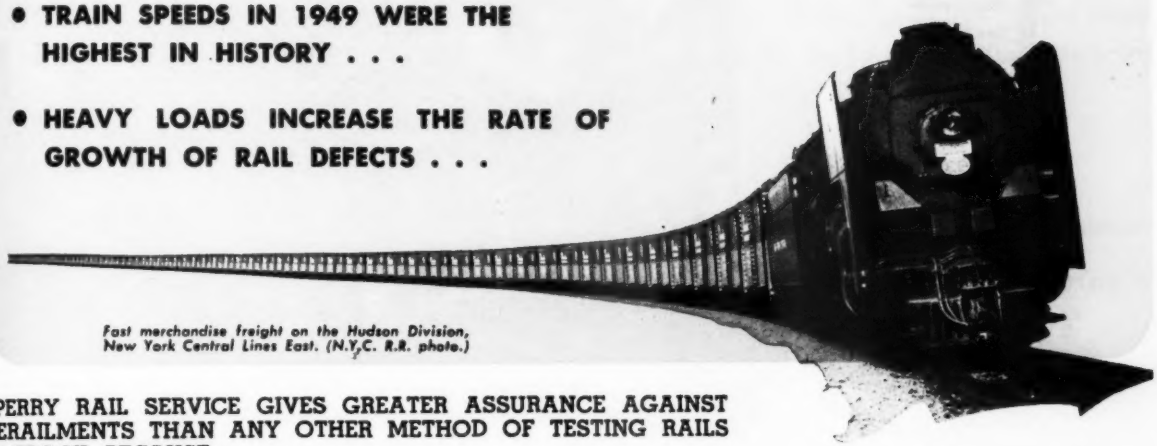
General Office
178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.

HIGHER TRAIN SPEEDS and HEAVY LOADS

DEMAND THE BEST IN RAIL TESTING FOR ECONOMY AND SAFETY

- **TRAIN SPEEDS IN 1949 WERE THE HIGHEST IN HISTORY . . .**
- **HEAVY LOADS INCREASE THE RATE OF GROWTH OF RAIL DEFECTS . . .**



Fast merchandise freight on the Hudson Division, New York Central Lines East. (N.Y.C. R.R. photo.)

SPERRY RAIL SERVICE GIVES GREATER ASSURANCE AGAINST DERAILMENTS THAN ANY OTHER METHOD OF TESTING RAILS IN TRACK, BECAUSE:

SPERRY RAIL SERVICE FINDS MORE AND SMALLER TRANSVERSE DEFECTS, AND MORE LONGITUDINAL HEAD DEFECTS, THAN ANY OTHER METHOD • • •

Fewer small defects left in track mean less danger of sudden growth to large size.

Large size defects cause 4 times as many rail failures as do small defects*.

*Based upon statistical report of 1949 rail testing by Sperry Rail Service. This report has been published in Technical Data 01-731. Write for your copy today.

Detail Fracture — a type of transverse defect, occurring in CC rail, which has shown a marked tendency to fail while of small (0-20%) size.

Sperry

FIRST IN RAIL TESTING

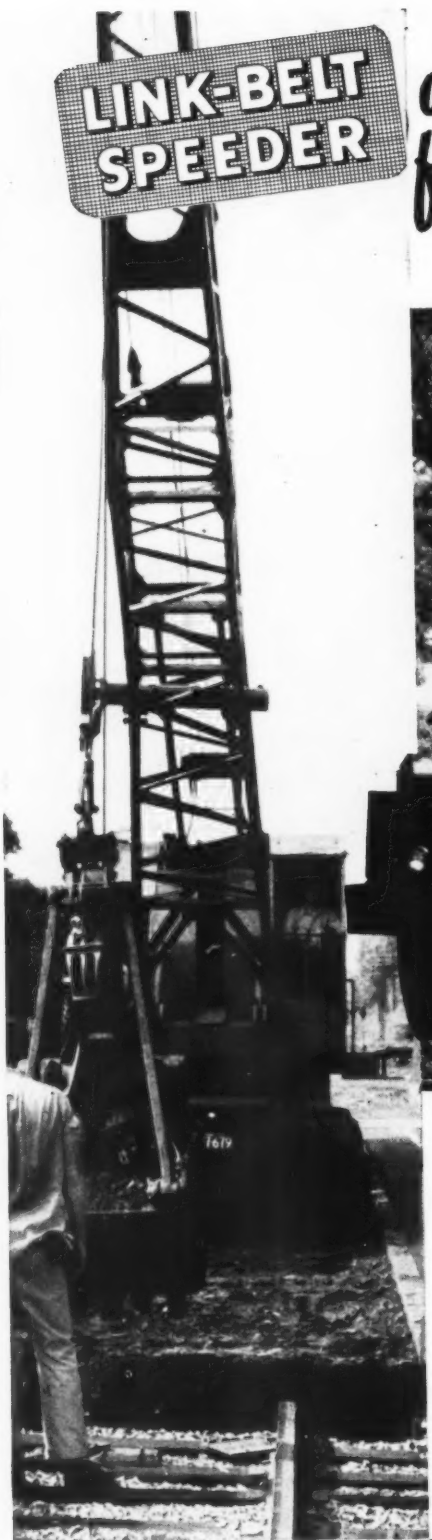
SPERRY RAIL SERVICE

DIVISION OF SPERRY PRODUCTS, INC.

Danbury, Connecticut

NEW YORK, N. Y. CHICAGO, ILL. ST. LOUIS, MO.

LINK-BELT SPEEDER *on wheels*
for **Faster, Simpler, Cheaper RAILROAD MAINTENANCE**



With off-the-track Link-Belt Speeder equipment you can meet exacting maintenance and construction schedules — without interrupting traffic. Besides being faster in moving off the right-of-way, wheel-mounted Link-Belt Speeders move faster from job to job — at reduced transportation costs — and are more mobile on the job. They're more maneuverable, too: they move easily and safely in close quarters. And talk about dependable! — a Link-Belt Speeder stays at work, trouble-free, even when the going is roughest.

Send now for catalogs of off-the-track wheel-mounted Link-Belt Speeders, or get the details from your nearby distributor.

An HC-70 Truck-Crane proves faster, simpler and cheaper at replacing ballast during track-resurfacing operation on the Boston & Maine.

11.828

LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA

Builders of the Most Complete Line of SHOVELS-CRANES-DRAGLINES

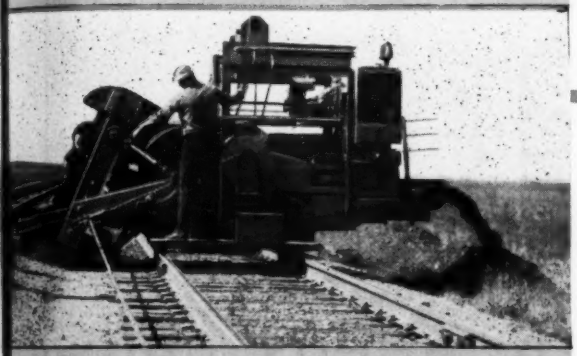
NOW AVAILABLE ON DIRECT SALE OR LEASE...

These 3 NORDBERG MACHINES provide the answer to your BALLAST RECONDITIONING PROBLEMS

Four CRIBEX units removing fouled gravel ballast

CRIBEX

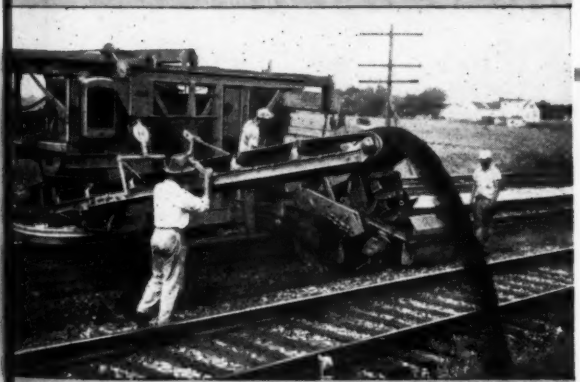
- For removing fouled ballast from between ties and switch timbers.
- For lowering track.
- For cribbing when a complete ballast cleaning operation is done, together with the Nordberg Ballastex and Screenex.



BALLASTEX wasting muddy gravel

BALLASTEX

- Removes intertrack ballast in a wasting or track lowering operation.
- Excavates intertrack or shoulder ballast and feeds to Screenex in a cleaning operation.



BALLASTEX — SCREENEX cleaning stone ballast

SCREENEX

- Intertrack and shoulder ballast screen-cleaned where partial cleaning is desired.
- Crib material plus intertrack and shoulder ballast screen-cleaned where complete cleaning is necessary.

• These three Nordberg Machines provide you with a maintenance "tool" that is as flexible as it is economical . . . *and now, these time-tested Nordberg Machines are available either on a direct sale or lease basis.* Write for Bulletin 174.

R1249

Look to NORDBERG

. . . *for continually improved* TRACK MAINTENANCE MACHINERY *to do a Better, Faster Maintenance Job at Lower Cost*

NORDBERG MFG. CO., Milwaukee 7, Wisconsin

RECOGNIZED RESEARCH

has developed

TCA-CHLORATE

Patent Pending

A proven killer of weeds and grasses for increased maintenance economy

Complete Weed Killer Service

The R. H. BOGLE COMPANY

ATLANTA, GA. ALEXANDRIA, VIRGINIA MEMPHIS, TENN.

Here's a 15,000 GPH Pump you can carry in one hand!

Engine and pump together weigh only 57 pounds

Self-priming, non-clogging, centrifugal pump
3-inch inlet and discharge
Special McCulloch 5-hp gasoline engine with anti-friction bearings throughout
Built-in fuel tank; three-way valve for auxiliary tank if required
Suction lifts up to 28 feet
Special base for good footing in hard or soft ground
Cast-iron impeller and replaceable wear plate
Automatic self-lubricated shaft seal
Automatic pressure-controlled governor maintains correct speed during self priming and at all loads
Entire unit lubricated automatically by engine fuel
Automatic rewind starter

BUILT TO THE SAME HIGH STANDARDS AS McCULLOCH CHAIN SAWS

McCULLOCH MODEL 15M PUMP SEA LEVEL PERFORMANCE TABLE

TOTAL HEAD INCLUDING FRICTION	HEIGHT OF PUMP ABOVE WATER 10 Ft.	15 Ft.	20 Ft.	25 Ft.
20 ft.	250 GPM			
25 ft.	245	210 GPM	170 GPM	
30 ft.	235	205	165	130 GPM
40 ft.	215	190	160	125
50 ft.	185	165	145	120
60 ft.	135	130	125	105
70 ft.	65	65	65	60

NATIONWIDE SALES AND SERVICE

McCULLOCH MOTORS

CORPORATION

Los Angeles 45, California

Export Department: 301 Clay St., San Francisco 11, California, U. S. A.

SEND COUPON TODAY

McCULLOCH MOTORS CORP. Dept. MR
Los Angeles 45, California

Please send me complete details on the McCulloch Model 15M Pump.

Name_____

Address_____

City_____ Zone____ State_____

WHAT HAPPENED to a Railroad Tie

This creosoted hardwood tie was installed on a main line curve on a grade without a pad beneath the tie plate. The photograph is of the inner end of the tie and shows plate cutting of .56 in. after 8 years of service.

. . . WITHOUT a Tie Pad

This creosoted hard wood tie was installed near the one above, with one of our resilient tie pads made of cotton and rubber used beneath the plate. The Photograph is of the inner end of the tie. Plate cutting amounted to only .06 in., a reduction in wear, from the tie shown above, of 89%, after 8 years of service.

. . . WITH a Resilient Tie Pad

17 ADVANTAGES OF FABCO TIE PADS

1. Prevent cutting of ties by plates.
2. Extend tie life.
3. Reduce labor costs by less frequent tie renewal.
4. Maintain gauge.
5. Save labor of re-gauging.
6. Have exceptionally long life — comparable to tie life.
7. Withstand extremes of temperature, moisture, brine, sand.
8. Do not squash or crush under extremes of temperature or long service.
9. Have great strength under load.
10. Permanent resiliency assures tight spikes.
11. Resilient winter and summer.
12. Cushion track structure from impacts.
13. Assist in maintaining line and surface.
14. Reduce need for larger tie plates.
15. Compensate uneven bearing surfaces.
16. May be transferred from one location to another.
17. Low pad cost.

Long pad life plus extended tie life insure large maintenance saving.

On bridges, switches, curves and station track the use of Fabco Tie Pads is economically sound. No better method exists to prevent mechanical wear of ties, extend tie life and cut the high costs of tie maintenance.

Write for latest Information

FABREEKA PRODUCTS COMPANY
Incorporated
222 M Summer St., Boston 10, Mass.

NEW YORK CHICAGO DETROIT
PHILADELPHIA SPARTANBURG, S. C.
OAKLAND, CALIF.

ON BRIDGES, SWITCHES, CURVES AND STATION TRACKS

It Pays to Specify FABCO TIE PADS

WRITE US TODAY

You Get these Big Bonuses

only with ALLIS-CHALMERS POSITIVE SEAL 1000 HOUR LUBRICATION . . . . .

Allis-Chalmers Model HD-5 — 40.26 drawbar hp. — with Baker engine-mounted bulldozer.

On all Allis-Chalmers crawler tractors, you can operate six months on a 40-hour week basis with just one lubrication of truck wheels, front idlers and support rollers — units that are normally subjected to the greatest wear and are most difficult to service properly. Think what this elimination of daily or even weekly attention means in labor and lubricant savings . . . and in working time gained! Think of the safety factor, too — no costly damage by greasing neglect.

Look At These Bonuses

DAILY GREASING PERIODS ARE ELIMINATED . . . there's less downtime, more productive operating time.

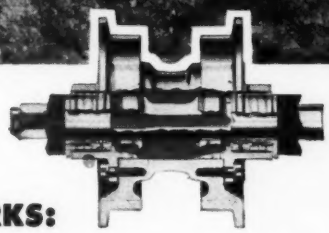
SAFETY FACTOR AUTOMATICALLY PROTECTS TRACTOR OPERATION . . . adequate lubrication is assured for long operating periods . . . no costly damage by greasing neglect.

REPAIR PARTS EXPENSE HELD TO MINIMUM. Operator can safely select convenient time and spot to replenish lubricant.

FULL PROTECTION IS ASSURED . . . grease kept in, dirt kept out. Daily cleaning of grime and dirt from truck frame to get at grease fittings is eliminated.

LUBRICANT COST REDUCED. Units are grease packed at the factory. Thereafter lubricant need be replaced only once every 1,000 hours.

REDUCED FRICTION DELIVERS MORE POWER. Equipped with tapered roller bearings, wheels rotate smoothly inside and out. Bearings are located directly under the load—reduce side thrust and wobble—last longer . . . easily serviced.



HERE'S HOW IT WORKS:

Designed and constructed with tapered roller bearings and Positive Seals, the truck wheels, front idlers and rollers are not affected by dust, loose sand, soft ground, mud or water.

The seal consists of two steel rings, hard and smooth as glass, held together tightly by steel coil springs. One seal ring is stationary, one turns with the wheel. The sealing surfaces are ground to within several millionths of an inch of perfect flatness and are lubricated, as are the tapered roller bearings, from a large grease reservoir sealed inside the wheel.

Flush Lubrication Protects Positive Seal Faces

Pumped easily into the shaft channels, lubricant washes smoothly through the rear and front roller bearings, then back to the shaft, flushing out past the grease gun nozzle. Old grease is replaced by clean, fresh lubricant. Low-pressure, flush-type lubricating action eliminates seal popping . . . keeps seal face smooth and clean of grit and dirt . . . reduces wear . . . increases seal life.

★ CHOICE OF FOUR DIESEL TRACK-TYPE TRACTORS — from the 11,000-lb. HD-5 to the *World's Largest*, 40,000-lb. HD-19 with torque converter drive.

ALSO Five Models of Motor Graders ★ Five Sizes of Power Units ★ Two Models of Wheel Tractors ★ And a full line of Allied equipment.

ALLIS-CHALMERS

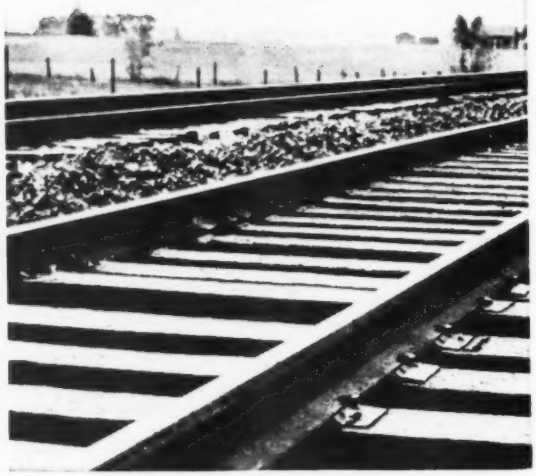
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

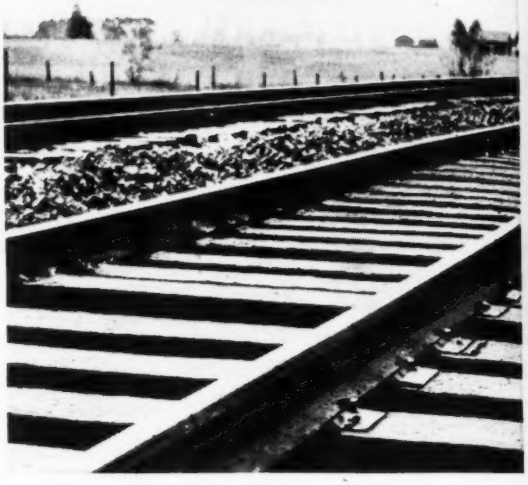
For Greater Production • For Easier Operation • For Simplified Servicing

HAND-CRIBBING
COST PER MILE
$1214.00

VS.

MACHINE-CRIBBING*
COST PER MILE
$264.40





That's how the Pullman-Standard *POWER TRACK CRIBBER *pays for itself!*

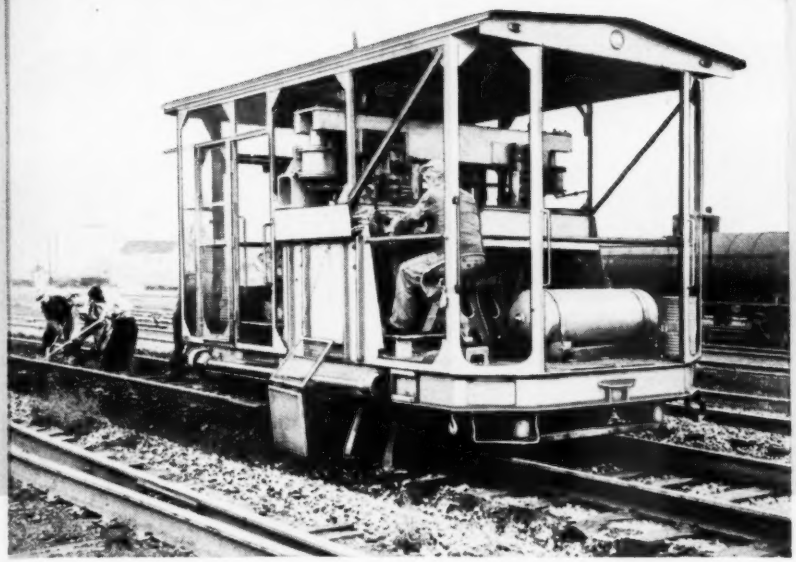
The cost figures above (based on rates *before* Sept. 1, 1949) came straight from a leading railroad that has used Pullman-Standard Power Track Cribbers for several years. And note this—for machine-cribbing they *include* interest on investment, depreciation and maintenance, fuel and oil.

That's economy on a major scale. Also, it's economy coupled with a *better job of cribbing*. The Pullman-Standard Power Track Cribber works with mechanical precision—crib after crib, mile after mile. Cribs are uniform in depth; profiles are uniformly sloped for proper drainage. And mechanized *speed* minimizes interference with line operation.

It doesn't take *long* for a Pullman-Standard Power Track Cribber to *pay for itself!* It's a self-liquidating investment that *today*, more than ever before, warrants closest examination by progressive railroad management.

Pullman-Standard
CAR MANUFACTURING COMPANY
POWER BALLASTER DIVISION
79 East Adams Street, Chicago 3, Illinois

BIRMINGHAM 3, 1004 First National Building • CLEVELAND 15, 907 Midland Building • PITTSBURGH 19, 1115 Gulf Building
NEW YORK 17, 52 Vanderbilt Avenue • WASHINGTON 6, D. C., 1025 Connecticut Avenue, N.W.
SAN FRANCISCO SALES REPRESENTATIVE: MARK NOBLE



Speedy... Powerful!

The Pullman-Standard Power Track Cribber can crib out from 170 to 250 feet of track per hour, depending on ballast condition. It travels to and from location under its own power, at a speed of 25 miles per hour. Complete setoff requires only 3 to 5 minutes.

TO GIVE TRACK THE "FULL TREATMENT"

Cribbing, ballast cleaning, and tamping may *all* be mechanized with Pullman-Standard track-maintenance equipment. Cribber, cleaner, and ballaster may be operated in production-line sequence, to give track the "full treatment" if desired. An important eastern road reported recently that two cribbers, followed by a cleaner and a ballaster, renovated their mainline track at the rate of 450 to 600 feet per hour!

● **The Pullman-Standard Ballast Cleaner cleans and replaces both cribbed-out and shoulder ballast, without fouling adjacent track.**

Available in 3 Ways

Pullman-Standard track-maintenance equipment is offered on terms calculated to meet any railroad's budgetary program:

1 **By outright purchase.**
2 **On installment terms.**
3 **By rental, with purchase option.**

Railroads are invited to write or call for full particulars.

● **The Pullman-Standard Power Track Ballaster tamps track more firmly and uniformly than is possible by any other method.**

"Track at Its Level Best" describes and pictures these money-saving machines. Write for a copy of this 24-page brochure.

CONCRETE

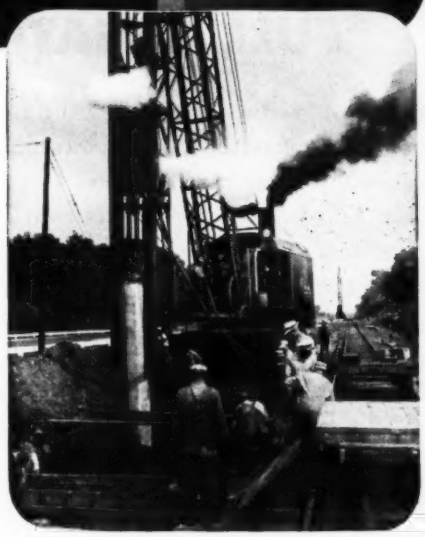
pile and slab trestles deliver long, economical service

MORE THAN a generation ago, in 1913, the Atlantic Coast Line first used concrete trestles in an installation at Ruggles Swamp near Rocky Mount, N. C. This project was so successful the railroad adopted concrete pile and slab trestles as standard construction in a trestle replacement program initiated in 1926. Every concrete trestle built by the ACL since that date is still delivering dependable, economical service year after year.

Recently, as part of this continuing program, a precast concrete pile and slab trestle was used in the reconstruction of an old timber bridge over McGirts Creek near Jacksonville, Fla. The new structure is a double-track, concrete-ballasted deck trestle 315 ft. 6 in. long. Only 94 days were required for the entire job.

Many other American railroads have found that large diameter precast reinforced concrete piles are ideally adapted for bridge replacement because they (1) give low cost per ton of load capacity, (2) are firesafe, (3) defy termites and other borers, (4) can be designed to meet a wide variety of climatic, topographic and service conditions, (5) have extra long life.

For more information write for free, illustrated, 80-page booklet, "*Concrete Piles.*" Distributed only in United States and Canada.



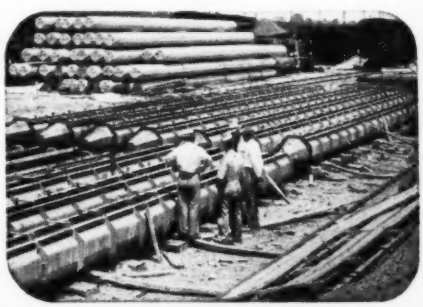
Upper photo: Completed concrete pile and slab trestle built by the Atlantic Coast Line over McGirts Creek near Jacksonville, Florida.

•

Center photo: Driving 24-in.x70-ft. precast concrete pile using a wood templet at deck level.

•

Lower photo: View of ACL main casting yard for concrete piles, South Rocky Mount, N. C.



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On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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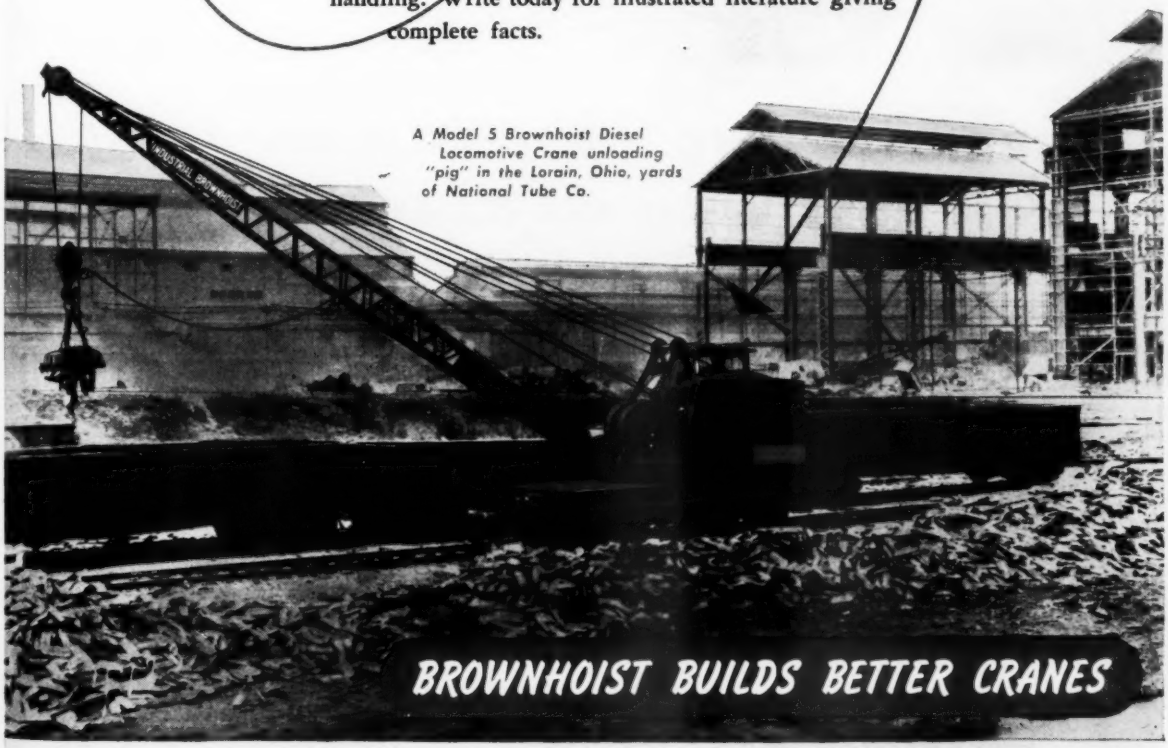

A Model 5 Brownhoist Diesel Locomotive Crane unloading "pig" in the Lorain, Ohio, yards of National Tube Co.

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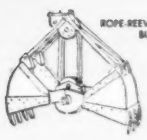
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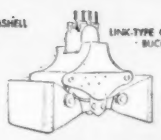
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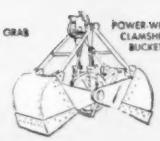
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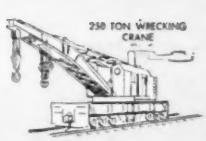
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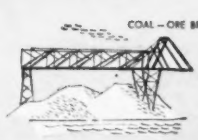
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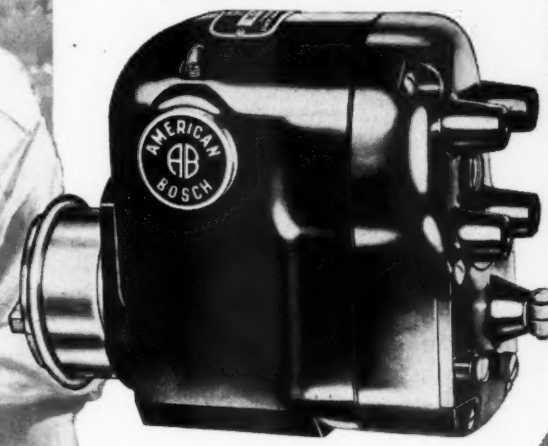

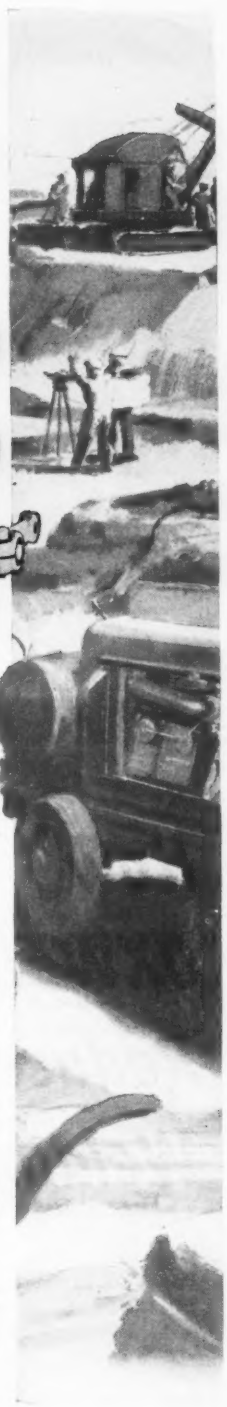

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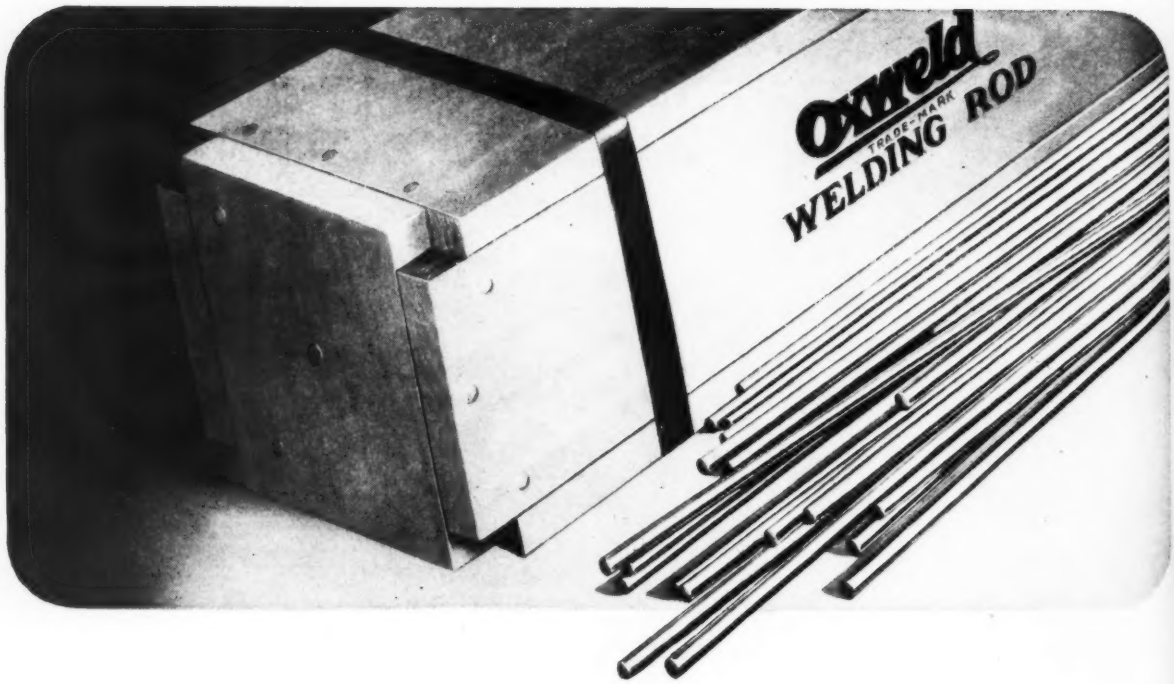

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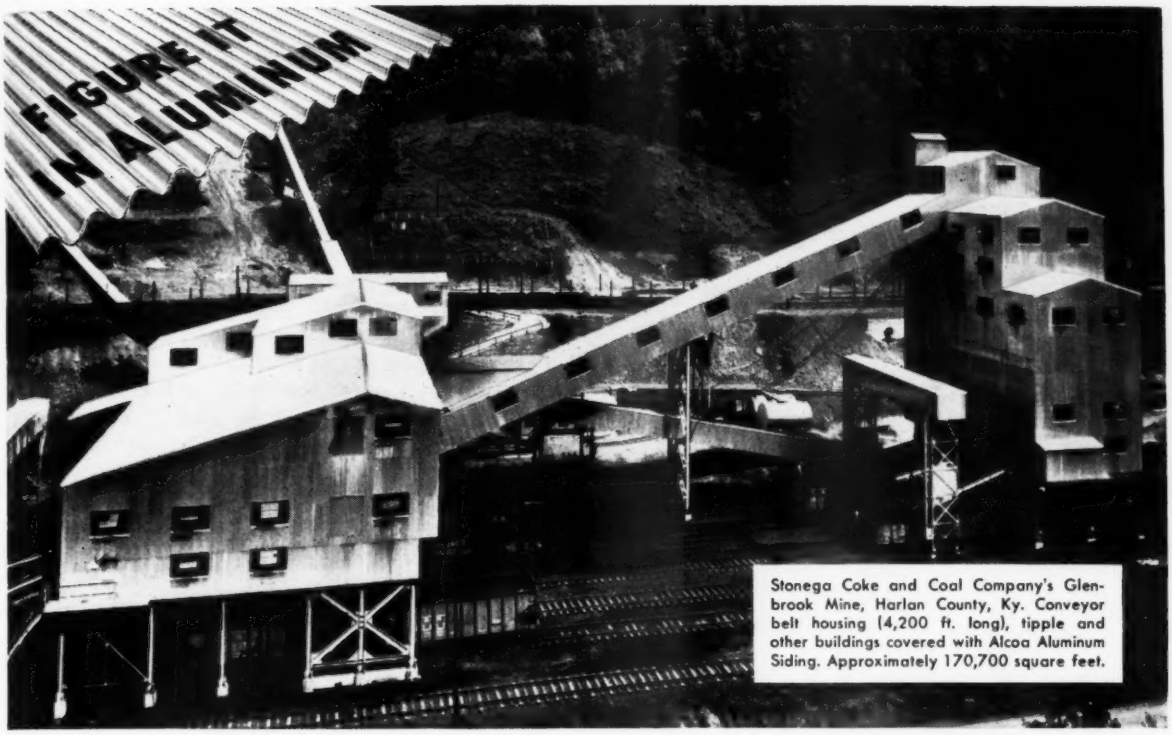

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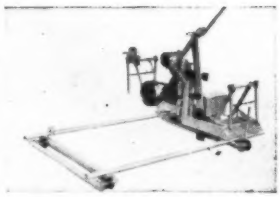
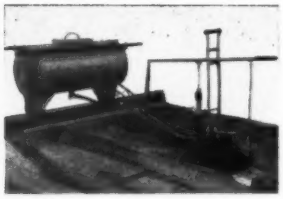
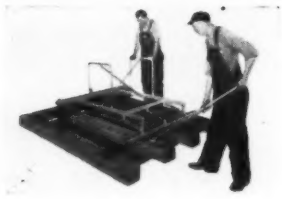


1 WOOLERY Tie Cutter and Undercarriage enables one man to quickly cut each worn tie into three easily removable pieces without disturbing ballast. Entire cutting operation is performed without lifting or turning machine. Total cutting time is less than two minutes per tie.



2 WOOLERY Creosote Sprayer, with 60 gallon tank capacity. Equipped with generator burner to heat creosote, and wind protection hood to safeguard operators, it applies a metered amount of creosote to each freshly-adzed tie. Does a safer, more economical and uniform job than is possible by old fashioned hand swabbing or broom-and-pail methods.



3 WOOLERY Tie Plate Spacer quickly and accurately locates single or double shoulder plates at exact position on ties. Light in weight so that one man can easily handle it on or off track.

4 WOOLERY self-propelled off-track Joint Oiler with three operators can spray joints on 1½ miles of track per hour. Uses heavy lubricants heated in 25-gallon tank and sprayed into joints under pressure, for thorough, long-lasting, economical lubrication.

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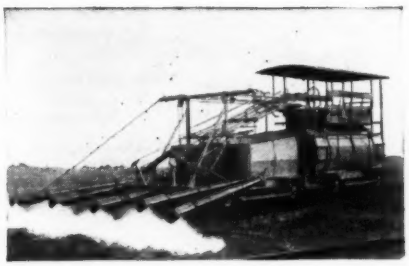
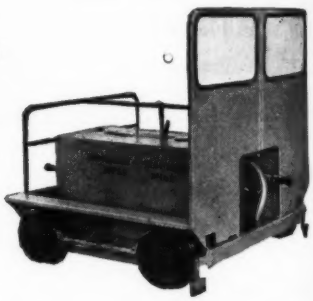


6 WOOLERY 300 Motor Car gives advantages of a light car, plus greater pulling power with 4 wheel drive and heavy duty performance. Carries 8 men and track tools. Can be fitted with detachable WOOLERY Flangeway Cleaner for winter duty.



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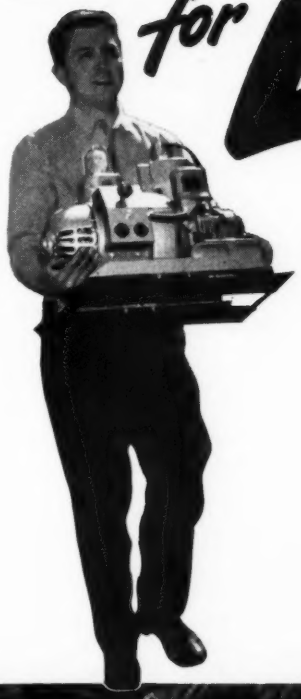
Go High Cycle for Low Costs

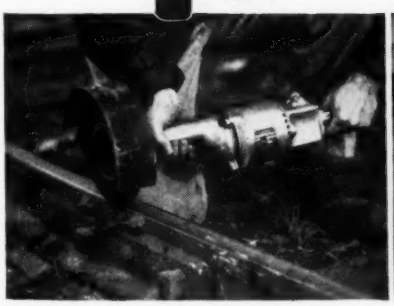


High Cycle Tools Operated by a HOMELITE *Dual Purpose* GENERATOR will greatly reduce your costs

High cycle tools are not only here to stay . . . they're here to *save.* Lighter in weight . . . easier to handle . . . more efficient in operation . . . these modern tools are saving money by cutting down man hours. Yes, and they're saving money on tool repairs because high cycle tools are far easier to keep in good condition.

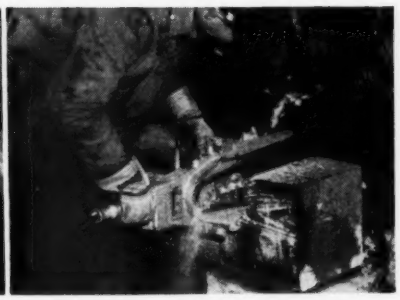
And the beauty of it all is this: — These savings are yours any place on your road if you have a Homelite Dual Purpose Generator. Light enough for one man to carry, this gasoline-engine-driven generator can be easily put into action *anywhere.* It provides plenty of power for operating high cycle tools. Moreover, this same generator can also be used to operate floodlights or your present standard universal tools.

Look into this Homelite Dual Purpose Generator. It's a big step in the right direction towards lower costs through high cycle operations.



For operating high cycle grinders

For operating high cycle wrenches



For operating Homelite Electric Chain Saws

STICK TO THE RULE OF THREE AND YOU'LL ALWAYS STICK TO A HOMELITE

1. Performance. A Homelite gives you plenty of power where you want it, when you want it . . . power with a large overload capacity . . . power that isn't sapped by long dangerous cables. It is not affected by extreme temperatures and is dust proof, rainproof, *foolproof.*

2. Dependability. The famous Homelite dependability is the result of building more than 275,000 gasoline-engine-driven units during the past quarter century. Finest, tested materials, precision workmanship, plus sound simplicity in advanced design are part of every Homelite.

3. Service. Close field supervision of every Homelite unit is a part of Homelite service. If you ever need repairs, there's a trained Homelite representative near you . . . ready for your call . . . ready to give you instant repair service in the field or in his completely stocked shop.

Carryable
Pumps • Generators •
Blowers • Chain Saws
• Paving Breakers

PERFORMANCE · DEPENDABILITY · SERVICE

HOMELITE
CORPORATION
206 RIVERDALE AVENUE • PORT CHESTER, N. Y.

3 useful air tools for bridge maintenance

Tough jobs of scaling are handled quickly with the CP Triple Scaler. No chisels are required — the pistons act as chisels, hammering old paint, rust or scale without damaging the underlying surface.

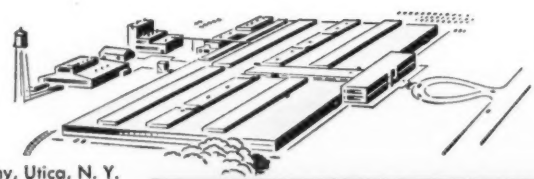
The Triple Scaler weighs only 7¼ pounds, has ½ inch stroke, and operates at 7,000 B.P.M.

For fast, safe nut-running, and the application or removal of bolts, studs or lag screws, and for screw spike driving use the powerful CP-365-RP Reversible Air Impact Wrench. No twisting or kickback, and little vibration, minimizes operator fatigue. The rotary impact action is controllable.

Capacity to 1¼" bolt size; over-all length 16¾"; weight 32 pounds.

Loose scale is rapidly removed from any metal surface with CP Wire Brush Machines. Models, with either straight or pistol grip handles, are available with a wide choice of radial and cup wire brushes. Operating speeds range from 4,200 to 9,000 R.P.M.

For further information send for a copy of SP-3008, Pneumatic Scaling Tools.



With its half million square feet of floor space, Chicago Pneumatic's new Utica unit is the world's most modern plant for the production of pneumatic and electric tools.

Chicago Pneumatic Tool Company, Utica, N. Y.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Freight Rolls

Smoothly and Economically

on Mastic floors

The warehouse interior above is typical of many recently built to increase the ease and economy of LCL freight handling.

And one of its prominent characteristics is the Asphalt Mastic Floor made with Flintkote Flooring Emulsions.

Why is this floor surfacing so popular for warehouse installations? Well, look what it offers:

SERVICE LIFE is long and trouble-free. Mastic floors made with Flintkote Emulsions are *heavy-duty* in the real sense of the word. They take exceptionally heavy point and moving loads. They provide a lasting smooth surface for material handling equipment. They're self-nealing of minor scars.

MAINTENANCE is minimized. Because these floors are so tough, repairs are infrequent. Yet when patching is necessary, the job is quick. And the smooth, unbroken surface is easy to keep clean and free from debris.

INSTALLATION is fast, easy and inexpensive. This mastic surfacing can be laid cold over almost any clean, firm sub-floor. This plus easy leveling and quick setting means either new installations or re-flooring go down in record time . . . with the area closed to traffic for as little as 24 hours.

And because of their unusually high capacity to absorb shock, mastic floors are especially satisfactory in multi-story installations. Then, too, the resilient surface is *much* quieter, feels warmer and will not dust under even the roughest use. All of which gives you a pleasanter, more comfortable surface on which to walk and work.

Add these advantages together, and the sum total is a floor that helps you handle LCL freight more easily, and more economically. Get complete information on Flintkote Flooring Emulsions, and how Mastic Floors can help you. Specifications for mixing and installing are yours for the asking. Write today.

THE FLINTKOTE COMPANY
Industrial Products Division
30 Rockefeller Plaza, New York 20, N. Y.

Atlanta • Boston • Chicago Heights • Detroit
Los Angeles • New Orleans • Washington
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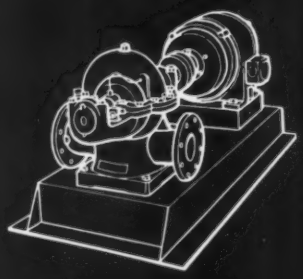
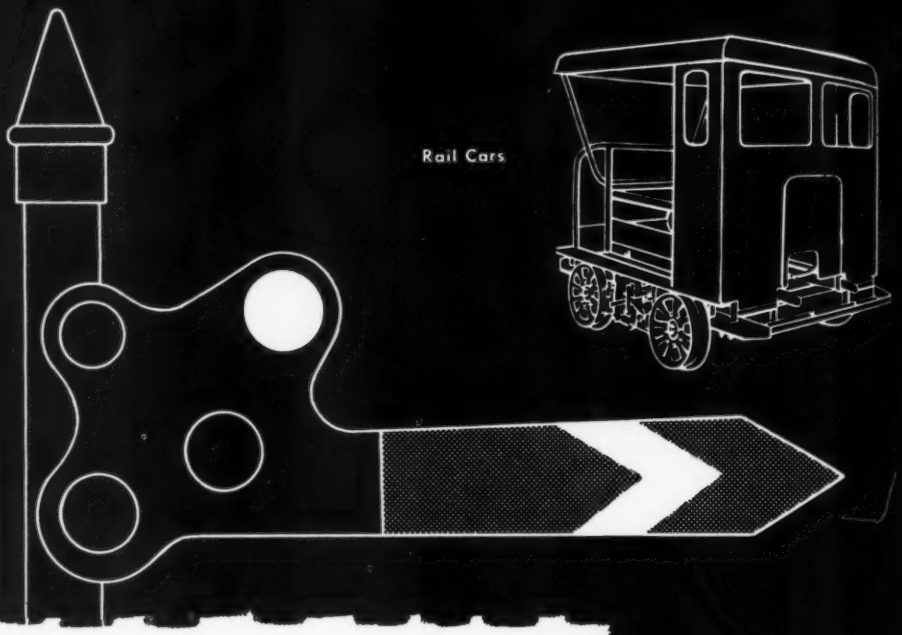
FLINTKOTE INDUSTRIAL PRODUCTS

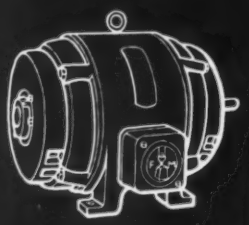
FLINTKOTE *Products for Industry*



Centrifugal Pumps



Rail Cars



Electric Motors
and Generators

FOR RAILROAD EQUIPMENT IT'S

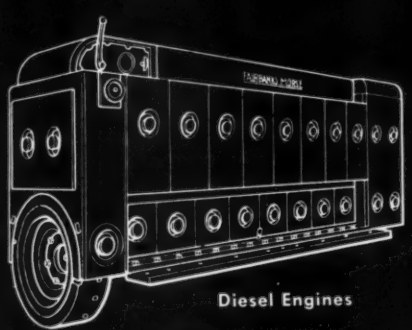
FAIRBANKS-MORSE,

a name worth remembering

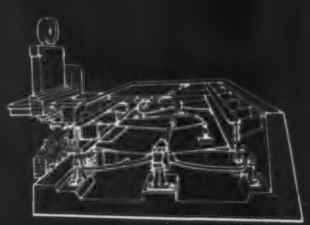
DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES
HOME WATER SERVICE AND HEATING EQUIPMENT • RAIL CARS • FARM MACHINERY

Water, Coal and
Sanding Stations

Turbine Pumps

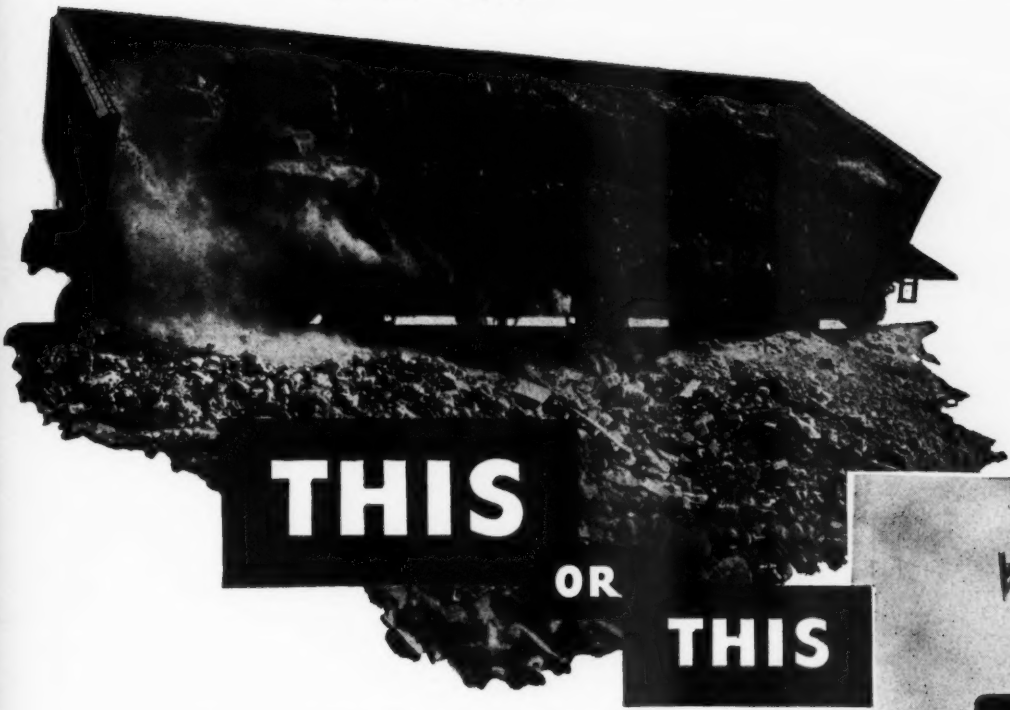


Diesel Engines

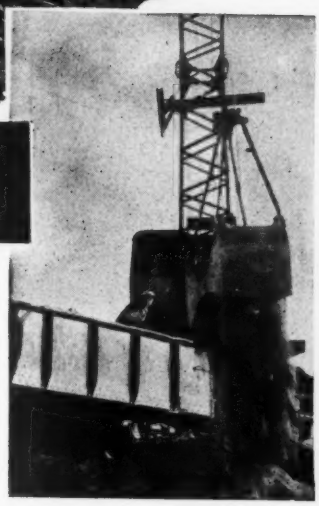


Truck Scales

Track Scales



THIS OR THIS



The Difference is $2600 a year per car!

That's a lot of difference.

Especially when you consider that it represents net savings from just *one* car in *one* type of maintenance-of-way service.

Look at it this way—

It takes time and skilled labor to unload worn-out, obsolete air dump cars or to unload gondolas with a crane. But it takes *less than a minute* for anyone to dump a fully loaded Magor Automatic Air Dump Car.

Figure that your work train costs about $200 a day. That includes time, labor and equipment. By replacing gondolas or old air dump cars with New Magor Automatic Air Dump Cars, you save at least an hour a day. That's your $2600 a year savings.

But you'll use your new Magor Air Dump Car for more than just one type of service. Probably everything from ditching to snow removal. And in every operation you are cutting time and labor costs.

Cutting work train costs is just one part of the story. Years of research, experience, field tests and top engineering skill are incorporated into the new Magor Automatic Air Dump Car. They'll operate efficiently and dependably under all conditions.

AVAILABLE TO MEET YOUR BUDGETING PROBLEMS

Magor maintenance-of-way Automatic Air Dump Cars are available on the following terms:

1. By rental on long term lease.
2. By rental with purchase option.
3. On installment terms
4. By outright purchase

For full particulars, write-wire-phone.

MAGOR

CAR CORPORATION, 50 CHURCH STREET, NEW YORK 7, N. Y.

World's Largest Producer of Air Dump Cars

It's Your Cost-Cutting Combination!

Here's how to really step up the usefulness and profit-making ability of your Oliver Wheel Tractor-Loader. Simply add an Oliver Hydraulic Mower and you get a cost-cutting combination that will be busy virtually all year round. You can install the mower quickly and easily for those few days or weeks of work per mowing month . . . pull it off for the regular run of loading jobs. It's the ideal combination to cut your operating costs.

This powerful mower fits right into your tractor-loader. Cutter bar is driven by the hydraulic pump of the loader so no separate power units are required. Mower will cut anything from thick matted grass to moderate brush—in fact, almost anything that will pass between the knife guards. Hydraulic safety mechanism practically eliminates knife damage. Operator can cut right up to

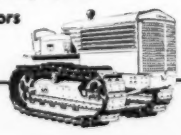
an obstruction . . . hydraulically raise the cutter bar to clear the obstruction...go right on mowing.

For all the facts on this cost-cutting combination that gives you year-round work with a tractor-loader-mower economically, see your Oliver Distributor or write us direct.

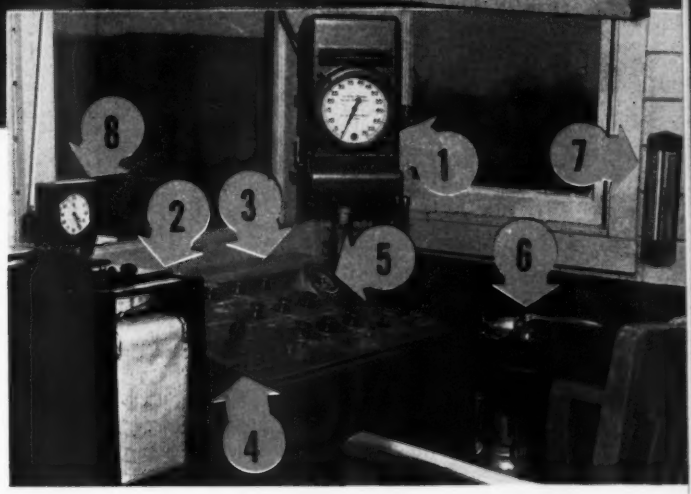
THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of Industrial Wheel and Crawler Tractors



POSITIVE DOSAGE CONTROL and WEED KILLING ACTION



THE *Nalco* SYSTEM of WEED CONTROL

SPRAYING Nalco's H-170 "top-and-root" weed control with one of Nalco's new *labor-saving* Weed Control Cars provides positive dosage regulation, as well as complete records for future reference! H-170 is sprayed directly from tank car without mixing or dilution. It assures a complete top kill of all succulent vegetation, and extensive root kill to retard re-growth. Rainfall after application will not reduce H-170 effectiveness . . . Safe to use where livestock may be grazing . . . Will not disrupt track signal systems, or contaminate water supplies.

Write for detailed information on H-170 and the complete Nalco System of Weed Control.

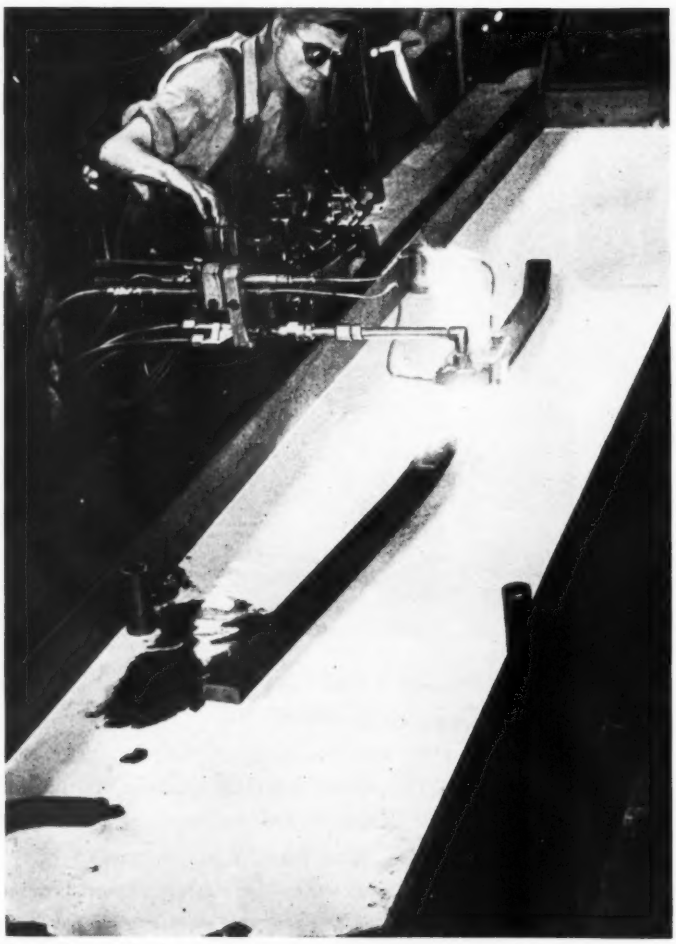
NATIONAL ALUMINATE CORPORATION
6196 W. 66th Place • Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

Top illustration shows Nalco Weed Control Car, with three-bank, 22-feet-wide sprays, and an additional 13-foot side spray boom for sidings. Lower photo shows operating controls of Spray Car. 1 Recording speedometer, 2 Recording H-170 flow meter, 3 Nozzle bank control valves for pinpoint spraying accuracy, 4 Left-side spray boom control, 5 Spray manifold pressure gauge, 6 Nalco Meter-Chem main control valve 7 Indoor-outdoor thermometers, 8 Timing clock. Not shown are intercommunicating telephone equipment for direct contact between Nalco Spray Car and work train locomotive, and direct-connected 50-foot auxiliary hose reel and spray nozzles for off-track spraying.

THE *Nalco* SYSTEM • Serving Railroads through Practical Applied Science

TWO YEARS' SERVICE...

proves flame hardening of frogs cuts frog replacement and maintenance costs of rolling stock



Setup showing the flame hardening operation with special quenching bath.

Here you see the wear behind the heat treated area, and get some idea of the traffic over the frog.

Several years ago, open-hearth carbon steel frog service life in certain locations on one of America's leading railroads averaged six months — replacement costs ran high.

In August 1947, Airco's modern flame hardening method was introduced, and flame hardened frogs were installed on switching leads — points where they would receive the greatest abuse.

A continuing test on these flame hardened frogs was made. It was found that after hardening the frogs about 32 inches on the wing, and 20 inches on the point, the rate of wear on the wing and point was uniform over a two-year period. This meant a drastic reduction in shock to the rolling stock – reduced maintenance costs.

The Airco flame hardening process is simple and economical. It is flexible and selective for application in the shop on small or large objects — flat or circular surfaces. Its outstanding quality is, it provides sufficient surface hardness to retard wear without affecting toughness or shock resistance of the core metal.

For further details about this process, write your nearest Airco office.

Costs Come Down Under The Airco Plan

AIRCO

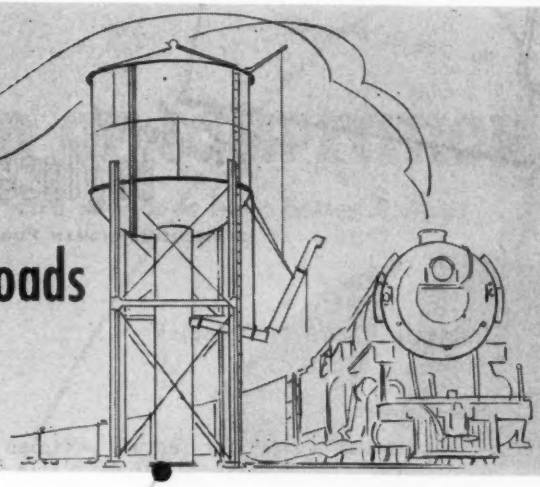
AIR REDUCTION

Offices in All Principal Cities

SINCE 1905

America's Leading Railroads

specify



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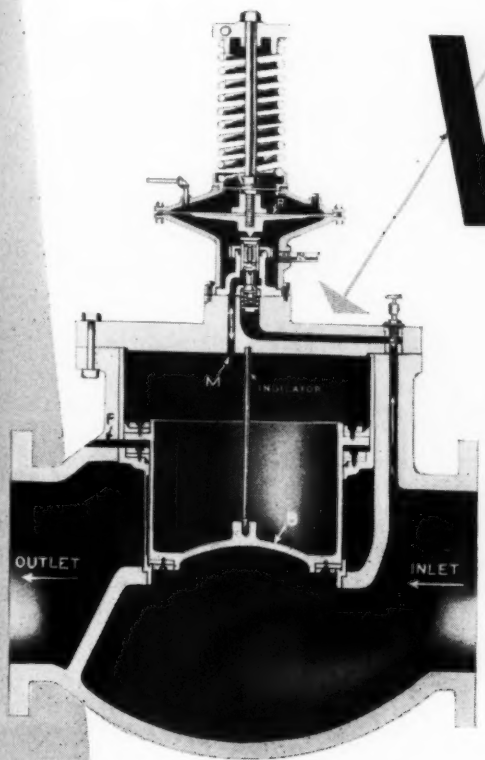
ALTITUDE

VALVES



Golden-Anderson Cushioned Altitude Valves have proven efficiency and performance records on elevated tanks of the main railroads of America. These valves maintain a uniform water level and can additionally be arranged to automatically function pumps, electrical devices or signal lights. The air and water cushioning in all Golden-Anderson valves prevents any shock or hammer and permits valve to operate smoothly at all times. *Write for technical data.*

GOLDEN-ANDERSON *Valve* SPECIALTY CO.

2078 Keenan Building Pittsburgh 22, Pa.

LIFE AND PROPERTY PROTECTION

VALVES SINCE 1905

No. 258 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION
79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: Ideas For Articles

June 1, 1950

Dear Readers:

Obtaining "leads" for feature articles is a never-ending task of an editorial staff. The basis of our effort in this respect is the conviction that, to command attention, each article must be of current interest or value to an important segment of the readership. The articles in this issue provide a representative cross section of the different ways in which leads are obtained for feature material.

Because of the current interest in rails longer than the present standard there is a manifest need for information regarding methods of handling such rails in making renewals. Since the Chicago & North Western has been laying 78-ft. rails at certain locations for a number of years, inquiry was made of L. R. Lamport, engineer maintenance of this road, who explained that a relay project involving the use of power rail layers for handling these long rails was soon to be carried out. Result--the article detailing the road's experience with these machines.

Also the outcome of our desire to fulfill a particular need--in this case of water service men--is the article describing an unusual drainage system installed by the Chicago, Burlington & Quincy at a coach-watering platform. The result of a conversation with Walter D. Gibson, water service engineer of the Burlington, this article is one of several that have been published with the objective of keeping you advised of progress in devising coach-watering systems to satisfy the sanitary requirements of public bodies.

Leads for two other articles in this issue came out of more or less casual conversations with railroad men. A. W. Schroeder, chief engineer of the Chicago & Eastern Illinois, mentioned the brush-cutting methods in use on his road while having dinner with a member of the staff, and the lead for the story on modernizing passenger stations on the Texas & Pacific was picked up by another editor during a visit to the company's general office at Dallas.

Two of the articles are based on addresses presented before interested groups by railroad men. These are the article on packed-chord trestles, by H. J. McKenzie, and the one on how to be a successful supervisor, by Harvey C. Marmaduke. The keen interest shown by the listeners in the material presented was the determining factor in the decision to publish these addresses.

The article describing the operations at a ballast pit on the Union Pacific is based on material volunteered by the railroad. Also unsolicited is the article on the use of charts in determining culvert sizes, by G. A. Ausband. Interest in tie-renewal equipment is at such a high pitch that it was decided to present the article on the Fairmont tie remover as a short feature instead of putting it in the Products of Manufacturers section.

This account of how articles originate would not be complete without mention of the care with which prospective article ideas are weighed to determine their suitability. The editorial mill grinds exceedingly fine, which means that for each idea that is finally selected at least several are discarded because they reveal shortcomings when subjected to that final measuring stick--your interests and needs.

Yours sincerely,

Merwin H. Dick

MHD:ag

Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

4 JUMPS AHEAD OF COMPETITION...

Yes, the Universal Frog for yard service is built better 4 ways . . .

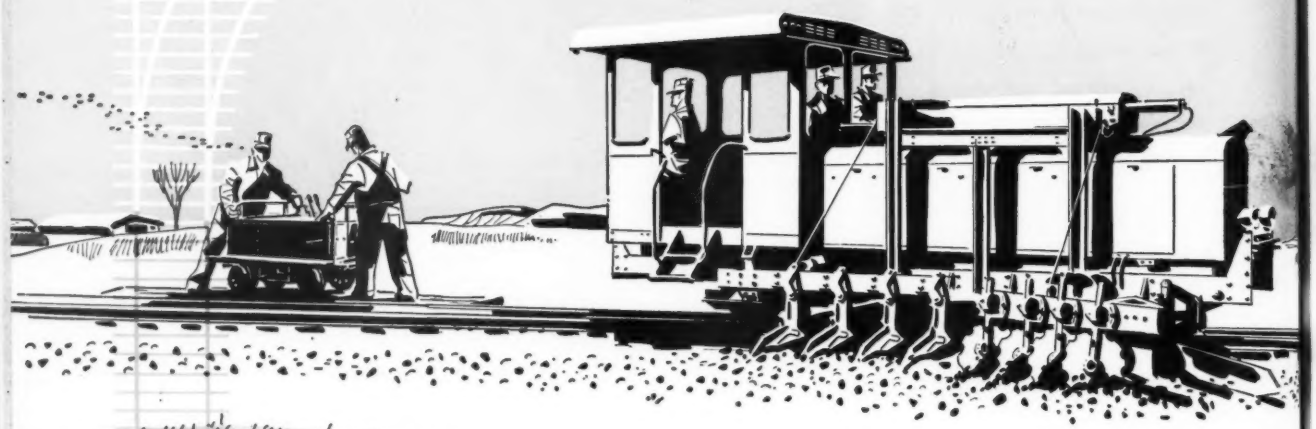
- It is made of an alloy electric cast steel that adapts itself to low cost electric or oxy-acetylene welding in track or shop.
- Tie plates are cast integral with the Universal Frog—an exclusive!
- Rail supports are cast integral on both ends of the Universal Frog —another exclusive!
- One-piece construction — no loose joints. Eliminates extra parts and cuts down maintenance costs.

HERE'S PROOF: Compare the cross sections of the Universal Frog with conventional types. Note the improved type rail joints, the patented supporting shelf, integral tie plates and rib construction.

Fairmont

RAILWAY MOTOR CARS
AND WORK EQUIPMENT

.... the name that put machines to work



Fairmont W77 ballast maintenance car, designed for mounting scarifiers, discs, ballast equalizing boxes, two sizes of bladers and a center plow, is a real time saver. Hydraulic power makes it applicable to a wide range of operations.

The story of the monumental task of unburdening man from the arduous labor of railway maintenance is the history of Fairmont itself. It is a story of over half a century's slow and painstaking work — told by genius and research, and realized in steel and power. Step by step, back-breaking toil was eased and speeded by machines—and then the machines were studied and improved . . . and studied still more. Eventually, every phase of railroad operation found its mechanical master as the first crude tools and artifices grew into the modern railway maintenance equipment of today. We of Fairmont are proud to have played so vital a role in a work that has proved of such great importance to the nation's industrial life. And we are confident that our continuing efforts toward further improvement will lead to better, faster and more efficient railway maintenance for the future.

Performance
ON THE JOB COUNTS

FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

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PRINTED IN U.S.A.

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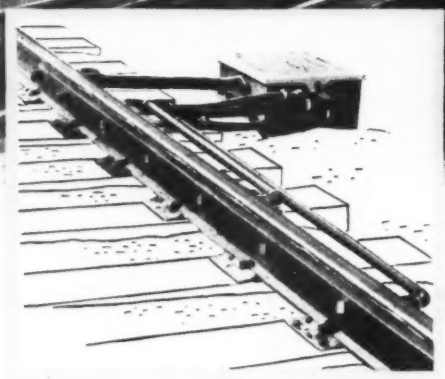
Racor model 4000-A

RAIL LUBRICATORS



Effectively reduce curve resistance and wheel flange wear on the scenic Denver & Rio Grande Western

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Being Human —

Is Necessary to Successful Supervision

It might be said that, in discharging his responsibilities, the maintenance-of-way supervisory officer operates in two realms of activity. One of these is the realm of material things—machines and materials, methods and procedures, maintenance allotments, work programs, derailments and washouts, and so on. The other realm is that of human relationships. Probably to a greater extent than is generally realized the degree of success achieved in the first field of activity is dependent on the amount of intelligent study and attention that is given the second.

In former years the factor of human relationships in the business world, including the railroads, was given scant attention. The "do-as-I-say-or-else" attitude represented a commonly-accepted method of dealing with subordinates. The view was widely held that, to be successful, a man had to be a "driver" and a hardboiled disciplinarian. The underlying thought in determining this attitude was the belief that the average subordinate would not do the most and best work of which he was capable unless subjected to continual pressure, that periodic criticism was necessary to "keep him in line", and that any show of kindness or consideration would be accepted as a sign of weakness and a signal to "lie down on the job."

To a considerable, although by no means universal, extent this "old school" attitude has been discarded in favor of the theory that a man cannot do the best work of which he is capable if he is harboring feelings of resentment, humiliation or neglect. This theory teaches that the way to get subordinates to do their best is for the superior to conduct himself in such a manner that he will secure their willing cooperation in putting his ideas and plans into action. It holds further that, since no one—not even the most competent supervisor—can expect to be an inexhaustible reservoir of new ideas, or a person of infallible judgment, the assistance of subordinates must be gained if the best methods or practices are to be developed, or if correct decisions are to be reached. Hence, the extent to which a person in a responsible position is able to win the cooperation of his subordinates will determine, in large measure, the degree of his success as a supervisor.

The problem of how to win this cooperation is one that deserves careful study on the part of every supervisory officer. It means that he must dig deeply into the realm of human relationships to determine what attitudes are necessary to secure the desired reactions from subordinates. A short cut to this objective is available in the studies of Harvey C. Marmaduke of the Illinois Central, whose conclusions are summarized in an article beginning on page 550 of this issue. The essence of these conclusions is that a genuinely human attitude toward subordinates, based on kindness and consideration and a manifest interest in their welfare, will be much more effective in the long run than the cold, tough approach that formerly was so common. This article is "must" reading for every supervisory employee, from section foremen right on up to the top.

DANGER AHEAD —

In Men Working With Inadequate Leadership

SIGNS seen along highways reading—Danger. Men Working—often elicit an amused smile from the motorist because so frequently, if men are visible at all, they are leaning on shovels or lolling in the shade of a tree. Forward-looking maintenance officers, contemplating the future, can visualize that same sign with a phrase added, making it read—Danger Ahead, Men Working **Without Adequate Leadership.** However, there is no amused smile for those who figuratively visualize such signs sprouting up all over their territories. Rather, there is a feeling of deep concern, for well do they realize that there is a growing tendency for the leadership of trackmen to become gradually weaker.

There is every indication that the seriousness of the situation is widely recognized, not only by management but by the men themselves. On both sides there seems to be an honest desire for a system under which promising young men can be selected and trained as foremen, and the feeling that, in the absence of such a system, future supervision will become increasingly inadequate.

Why then, if there is such agreement between the two parties most interested in the problem, are we not extolling the wonderful methods evolved by some particular road to train foremen, rather than discussing the dangers ahead? When a question on training foremen was recently offered in the "What's the Answer" department, why was it that not a single reply was received telling of a plan that was in effect? On the other hand so many answers were received commenting on the need for such a plan that all of them could not be printed.

A partial answer to the foregoing questions, indicated in at least one of the replies printed and in several of those withheld, was to the effect that working agreements with unions stress seniority as the controlling qualification required of a man before assignment as a foreman. Those espousing such agreements presuppose that seniority in itself grants to a man the ability to lead others, that it automatically endows him with the necessary education and even intelligence—as well as the required knowledge of individual work operations. Experience, on the contrary, has shown that much, if not most, of the qualifications and knowledge needed by a foreman can only be gained by intensive training for leadership and not by length of service. Equitable and effective means of training trackmen to become foremen are needed now, and that need is increasing daily.

Indications are that the unions have looked on this problem with a "dog in the manager" attitude, while too many railroads have let "sleeping dogs lie," until the problem has become so acute as to affect adversely the efficiency of maintenance operations. There can be no question but that the future interests of the unions can best be protected by cooperating in providing means for training promising trackmen as foreman so that they may look ahead toward advancement and continuing opportunity.

Only a comprehensive, carefully-prepared training program, conceived and adopted through the cooperation of all parties concerned, will solve the problem. The sooner such a training program is provided, the sooner will the railroads be able to attract and hold good young men in competition with other industries—and the sooner the figurative danger signs can be scrapped as obsolescent.

CROSS DRAINS —

Necessary Adjuncts of Ballast Cleaning

THE development of new equipment since the war plus recent improvements in earlier machines, have given ballast cleaning a much needed "shot in the arm". Never before have so many railroads embarked on such extensive ballast-cleaning programs as have been planned for this year. Some of these roads, for one reason or another, have never cleaned ballast until now. Therefore, it is to be hoped that they will profit by the lessons learned by those who have been cleaning ballast on a large scale for many years.

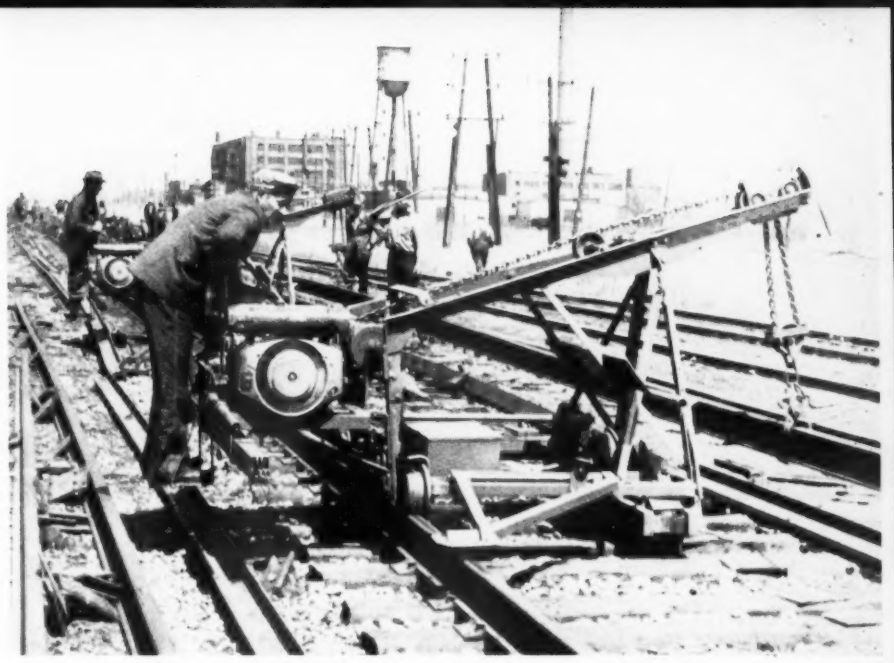
All too often in the past ballast-cleaning programs in multiple-track territory were enthusiastically pushed to rapid conclusion with little action being taken to provide adequate cross-drainage under tracks. It was soon learned that ballast cleaning without adequate attention to other aspects of the drainage problem, such as the installation of cross drains, was not a complete panacea for poor track. In the case of impervious subgrades water was found to accumulate in intertrack ballast ditches, where it caused the softening of the roadbed, so that the inside rails settled out of level, while free-draining shoulder ballast held outside rails in good surface.

One railroad that has an extensive ballast-cleaning program each year complements its clean ballast with cross drains at many locations. Every 100 ft. or so, ditches are dug across the tracks to a sufficient depth to drain the bottom of the ditch made by the ballast cleaners in the intertrack space. These ditches are then filled with clean ballast to form French drains. Pipe cross drains are installed in sags to preclude the accumulation of water at these locations. So as not to interfere with future ballast cleaning operations, such pipes reach only to the inside ends of the ties. Similar drain pipes are also installed at highway grade crossings not previously provided with adequate drainage.

In connection with ballast-cleaning work at locations where pipe drainage systems have been in place for a number of years with catch basins located between tracks, openings are cut in the sides of the catch basins and gratings installed at a level that will drain the intertrack ditch.

Such added attention to drainage details will assure that the full effectiveness of the ballast-cleaning operations will be realized, thus accomplishing the desired purpose—better track at a lower cost for future maintenance.

Since 1943 the Chicago & North Western has been laying double and triple-length rails as a means of reducing maintenance costs at locations where the subgrade is unstable. With a view to determining the most effective and economical method of laying these long rails the road recently used two Meco Type C rail layers, working as a team, for this purpose. In the hands of inexperienced operators the two machines laid 30 to 40 of the long rails an hour.



The long rail is picked up at its quarter points by the rail layers, and is hoisted about a foot above ground to clear the removed rails

Two Power Rail Layers Teamed to Lay 78-Ft. Rails

• Employing two Meco Type C power rail layers with its 100-man rail-laying gang, the Chicago & North Western recently laid three track-miles of welded 78-ft. 115-lb. rails near Waukegan, Ill., replacing 110-lb. rails. The use of long rails is not a new practice of the North Western as the road has been using 78-ft. and 117-ft. lengths since 1943 at locations where the roadbed traverses swampy or unstable terrain—a practice that has resulted in substantial savings in track maintenance costs at these locations. The use of the two power rail layers, however, was a new departure from the equipment normally assigned to such work, and the performance of these units, which were loaned to the road by the Maintenance Equipment Company, Chicago, was followed with considerable interest not only by the North Western's maintenance officers but also by observers from other roads.

Because of its favorable experience with the multiple-length rails, the North Western is continuing to use them at unstable locations. Generally, each year's rail-renewal program calls for the laying of at least a small mileage of such rails. The road now has about 43 mi. of 78-ft. and 117-ft. rails laid out-of-face. The longest of these sections are two 5 mi. in length and are located between Sioux City, Iowa, and Missouri Valley. The long rails are formed by welding together 39-ft. lengths by the Oxweld pressure-welding process undrilled where welded.

The road's 1950 rail-laying program includes four and one-half track-miles of 78-ft. rails, of which three miles, consisting of 115-lb. A.R.E.A. rails, were recently laid in the eastbound and westbound main tracks at a point north of Waukegan where the line crosses a swampy area. These rails were pressure-welded by a leased machine set up at West Chicago, Ill. Also involved in the rail relay at Waukegan were about 14 track miles of 39-ft. rails, plus a considerable number of turnouts and other special trackwork. The turnouts were laid with 39-ft. rails by a division maintenance gang of 20 men. The rails and other track materials were distributed in advance by a work train. When the 78-ft. rails were unloaded, a Burro crane was used to lift one end of each rail off the car while the other end was barred out and allowed to fall on the track shoulder.

The relay at Waukegan was the first work of the season for the newly-organized gang of 100 men. The gang was equipped with two Nordberg spike pullers, three Nordberg adzing machines, a Burro crane, a Nordberg tool grinder (mounted on a push car), two Nordberg power wrenches, and four Nordberg spike hammers, in addition to the usual assortment of hand tools Because the Meco power layers were used on a temporary loan basis, the Burro crane was made part of the assigned work equipment but was operated as a towing unit in its proper position in the gang organization, which was immediately behind the two power rail layers.

Are Self-Propelled

The Meco Type C power rail layer is an improved machine compared with previous models, the outstanding difference being that it is now a self-propelled unit while engaged in rail-laying operations. To move the machine when it is not so engaged, it is either pushed manually or towed

Machine operator pays out the hoisting chain to permit tongs man to fasten the tongs to the rail

After the rail has been hoisted, a dog at the end of the boom is tripped, which causes carriage to roll down and suspend rail over the tie plates

by a motor car. It can be removed from the track by the men engaged in its operation.

The improved power layer is a machine weighing approximately 2,200 lb. It consists of a chain hoist mounted on a fixed boom which is supported on a wheel-mounted metal frame, and is powered by a 10-hp. 4-cycle gasoline engine. The engine, two operating levers and an operator's platform are mounted on one side of the machine over two double-flanged wheels which roll on one of the running rails. The opposite side of the machine supports the hoist and boom on a crawler mechanism which travels on the ties when engaged in rail-laying operations, or on an auxiliary flanged wheel which travels on the other running rail when in towing position. Two vertical-folding flanged outrigger wheels, one at each end of the machine, are let down on the running rail on the engine side to give the machine lateral stability and to prevent its derailment when starting and stopping while it is carrying a rail.

Self-Locking Mechanism

The hoisting mechanism consists of a hoisting drum which is powered by means of a double-cone friction drive, a worm, and a worm gear for both the raising and lowering of the loads. When the power friction drive is released, the worm makes the drum inactive, thus making it self-locking for holding a load automatically in a suspended position. Hence, both the hoisting and the crawler mechanisms can be used simultaneously with no possibility of the load falling and causing injuries to workmen.

The boom of the power layer is made from two metal angle sections which are spread apart to permit a wheeled hoisting carriage to run on a track built between them. From the drum, the hoist chain runs over an idler wheel to the hoisting carriage, where it is threaded through a sheave and around a hoisting block to which rail tongs are suspended, then back to the hoisting carriage where it is anchored. When the tongs are pulled outward by a workman for picking up the new rail, the carriage rolls up to the end of the boom where it is locked until freed by a carriage trip dog. Sufficient chain is provided to permit it to be extended some distance in reaching for rails.

Sequence Unchanged

When using the Meco machines for laying the 78-ft. rails, there was no change in the sequence of operations normally followed when laying shorter rails. The usual operations were carried out in advance of the rail-laying machines, including the distribution of the new tie plates; the removal of the old rail anchors; the cutting of the bolts with a cutting torch; the pulling of the spikes; the throwing out of the old rail with safety rail forks; the removal of the old plates; the setting and driving of tie plugs; the lowering of the ballast in the cribs near the ends of the ties; the sweeping of the tie-plate seats and the driving down of broken spikes; the adzing of the tie-plate seats; the application of a wood preservative to the adzed areas and the setting of the tie plates. Although the base widths of the 115-lb. rail and the 110-lb. rail that was replaced are both 5½ in., new and larger tie plates were placed in the relay operation.

In previous years, when using a rail-laying crane to lay the 78-ft. rails, the crane carried a 39-ft. piece of rail which was heeled-in at the end of the last-laid 78-ft. rail, so that the crane could advance to reach the far quarter-point of the next 78-ft. rail. After the far end of the 78-ft. rail had been shifted to its approximate position, the crane retreated, moved the short rail aside, and lifted the near end of the 78-ft. rail into place. The long rail was then barred over to approximate gage to permit the crane to move over it in laying the next 78-ft. rail. This method required the services of five men; the crane operator, one man at the tongs, two men with bars, and one man heeling in. It also required at least two minutes time for each rail.

The railroad also gave consideration to another method of laying the 78-ft. rails, involving the use of a locomotive crane having a 45-ft. or a 50-ft. boom, and a 39-ft. bridle or spreader rail having tongs suspended at each end. However, even though this method should prove feasible and economical it would mean tying up an expensive piece of work equipment for a longer time than the crane could be spared.

When laying the 78-ft. rails at Waukegan, the two Meco power layers worked together and all movements were coordinated through signaled instructions by the operator of the leading machine. Although untrained, being men picked out of the gang, the machine operators had no trouble in handling the machines, in which all movements are controlled by two levers. The lever at the oper-

Working in unison under signals given by one of the machine operators, the rail layers move to heel the rail in. The self-locking hoist keeps load from slipping

ator's right, as he stands on the platform, controls the lifting and lowering of the rail tongs. When this lever is moved in one direction, the load is hoisted and when moved in the opposite direction the load is lowered. When this lever is in mid-position, the worm and gear mechanism holds the load stationary. The left-hand lever controls the movement of the machine along the track. When it is moved to the left or right the machine travels in the corresponding direction, and when it is in mid-position, the machine remains stationary.

There is another lever, within reach of the operator's left hand, for engaging and disengaging a clamp on the running rail on which the machine is operating. The purpose of this grip is to anchor the machine and prevent it from tilting when the initial lift is applied to the rail to be laid.

A total of six men was employed with the Meco power layers in laying the 78-ft. rails. These included an operator on each machine, a man handling each of the rail tongs, an end man for applying rail shims and heeling in the rail, and a man stationed near the middle of the long rail, who applied a track gage as the rail was lowered into place. This man also assisted the tongs men with a safety rail fork when it was necessary to turn a rail for attaching the rail tongs.

Rails Lowered at Gage

Working about 40 ft. apart, the power layers, in moving forward from one position to another, traveled on one running rail and the ties at a speed of about 3 mi. an hr., stopping at the quarter points of the long rail. The operator of each machine then unreeled the hoist chain and at the same time caused the rail grip to engage the running rail. When both tongs men had attached their tongs to the rail to be laid, the leading machine operator signaled the other operator and the rail was pulled toward the machines and then hoisted to a point about a foot above the ties. Both operators then released their rail grips. At another signal from the leading machine operator, each tongs man struck the carriage trip of his machine with a pick handle. Thus released, the hoisting carriage of each machine rolled down the boom to the stop position, causing the rail to be brought to a suspended position about 4 in. above the tie plates. The rail was then lowered onto the tie plates and, at the same time, the machines were moved backwards slightly to heel the rail against the last-laid rail. The tongs were then released and the machines moved into position for handling the next long rail.

The Burro crane followed immediately behind the rail layers, towing four heavy-duty push cars carrying supplies needed in the rail-laying work. Operations carried on behind the train of push cars included the painting of the rail ends with oil; the application of 36-in. toeless joint bars; the tightening of the nuts by Nordberg power wrenches; gage spiking at four locations on each long rail; the straightening of the tie plates under the rail; the driving of the remainder of the spikes by four Nordberg spike hammers; and the application of new rail anchors.

The unloading of the long rails had been carefully handled to place the new rails as closely as possible to where they would be laid. However, because of circumstances not foreseeable when the rail was distributed it was necessary, during the laying operation, for the rail layers to carry some of the rails on one side various distances up to 39 ft. Despite these extra moves, the machines laid from 30 to 40 rails an hour and generally were crowding the operations being carried out in advance of them.

Turning the Equipment

When the rail-laying work reached the limits of the relay project, the Burro crane was used to lift and turn the power layers as well as the other power equipment in preparation for relaying the other line of rails. However, this was a matter of convenience because the power layers carry a device to enable the machines to be set-off the track or to be turned by three or four men without the need of a crane.

The set-off and transfer device for each machine consists of two identical pivot saddles, along with wheel stops, beams, and a run-up ramp, totaling 140 lb. in weight. The beams are carried on hangers under the engine platform, the run-up ramp on the upper frame, and the remaining parts are kept in a tool box while the machine is working. When the power layer is to be turned, the two outrigger wheels are retracted to secure greater compactness. By placing the beams and devices in a prescribed sequence, and by using handles provided on the machine, the power layer is rotated to a position transverse with the rails and removed from the track.

The rail-relaying work described in this article was carried out under the general direction of E. C. Vandenburgh, chief engineer of the North Western, L. R. Lamport, engineer of maintenance, and J. P. Datesman, engineer of track, and was under the direct supervision of W. H. Huffman, division engineer, and E. A. White, roadmaster. Arrangements for using the two Meco rail layers were made through T. E. Rodman, president of the Maintenance Equipment Company. The operators were instructed in the handling of the machines by E. Overmier, vice-president of this company, and P. J. Wolf, engineer.

"Packed-Chord" Trestles Giv Go

By H. J. McKENZIE
Chief Engineer
Texas & New Orleans

The packed-chord trestle is considered a well-balanced design, with many advantages

Since 1932 the T. & N. O. has been replacing open-deck and ballast-deck timber trestles, as they come up for renewal, with structures incorporating the so-called "packed-chord" design. The advantages of this design, and the results his road has obtained with its use, were discussed by Mr. McKenzie before the annual meeting of the American Wood-Preservers' Association at Houston in April. Presented here is an abstract of Mr. McKenzie's remarks.

• In the early Thirties the Texas & New Orleans Railway Company (Southern Pacific Lines in Texas & Louisiana) made intensive studies aimed at finding a satisfactory and economical type of construction for use in replacing existing open-deck and ballast-deck timber-pile trestles as they came up for renewal. The studies were conducted under the direction of R. W. Barnes, then chief engineer and now vice-president, and E. A. Craft, at that time engineer maintenance of way, and now executive vice-president.

As a result of these studies a creosoted, open - deck "packed-chord" design was developed which has proved to be very satisfactory. This design is called the packed-chord type because the timber stringers comprising the chords are placed tightly against each other and fastened with through bolts, instead of being separated a few inches as in conventional construction. Since 1932 we have replaced about 235,000 lin. ft. of trestles with the packed-chord construction, and at present are maintaining approximately 379,000 lin. ft. of timber trestling of different types.

In bridges constructed on primary main lines the packed chords each consist of four 8-in. by 17-in. stringers. On lines where light power is operated three-ply chords are used. The bents are spaced 15 ft. apart and are capped with 14-in. by 14-in. pine timbers. Each cap is protected with galvanized sheet-iron end covers and a ⅜-in. steel plate covering the area under and between the chords. Attached to the steel plate are clip angles by means of which the chords are fastened to the cap. The ties are 8 in. by 8 in. in cross section and are spaced on 12-in. centers. Wood spacer blocks are used between the ties.

Originally we used 6-in. by 8-in. by 8-ft. ties spaced at 15-in. centers, with concrete spacer blocks between them. We had a considerable amount of trouble with the concrete spacer blocks cracking and falling out, and also found that, through vibration, they had a tendency to chew into the tops of the wooden stringers. Furthermore, we found that the 6-in. by 8-in. ties at 15-in. centers would split badly with the larger track spikes and not hold up under heavy traffic, thus occasioning need for using 8-in. by 8-in. ties.

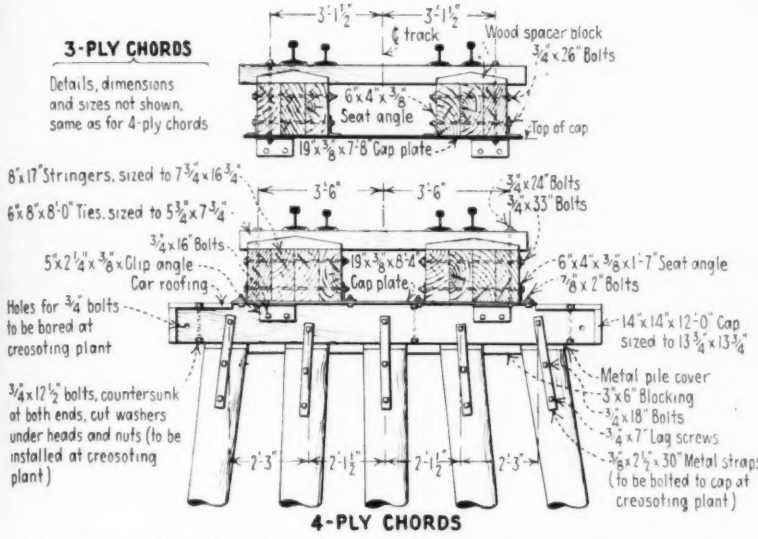
Inner metal guard rails are used only on trestles 45 ft. or more in length. Outside timber guard rails are eliminated on bridges with inner guard rails, but are used on packed - chord bridges having lengths of 15 ft. and 30 ft. All of the creosoted timber used in our packed-chord bridges is pre-framed before treatment and no cutting or boring in the field is permitted except that necessary for attachment of bracing members.

We consider the packed-chord trestle a well-balanced design, with indicated equal life span of the substructure, the chords and the deck. In the 18 years this type of structure has been used on our lines, we have not changed out any stringers and only a very few caps. With the type of treatment being used, and under prevailing climatic and traffic conditions, the packed-chord trestles are expected to have a service life of 30 to 35 years—about the same as ballast-deck bridges. At the present time the cost of our packed-chord trestles is averaging $65 per foot as compared with $80 for ballast-deck structures.

There are three claims that can be made for the ballast-deck

Good Service

The packed-chord pile trestle has been found to be highly resistant to damage during floods, derailments and fires



Cross section of the packed-chord pile trestle as used on the Texas & New Orleans

bridge, which may be considered advantages over the open-deck type, namely, it presents less fire hazard, more uniform riding conditions can be maintained, and the maintenance of line and surface can be handled by track forces instead of by bridge mechanics.

Advantages of Design

The packed-chord trestle, however, in addition to its lower cost, has far more advantages in its favor—compared with the ballast-deck type. These may be summarized as follows:

(1) A greater waterway opening can be provided with the same length of bridge and the same top-of-rail elevation, because 8 in. of ballast and 4 in. of deck flooring are eliminated.

(2) It is easier to repair and to inspect. There is no element of guess, such as experienced in deciding whether or not deck flooring in ballast-deck structures is in need of renewal.

(3) It will withstand, without damage, floods in which water flows over the top of the bridge to a depth of several feet. In contrast, it is seldom that a ballast-deck bridge is topped by water but all of the ballast is washed out and the track lost.

(4) It is highly resistant to damage during derailments. On numerous occasions derailed cars have completely sheared all ties on packed-chord bridges without distorting line or gage, or tying up traffic before repairs were made. Where steel guardrails have been used on these structures derailed cars have been dragged completely across the bridges without causing any damage except marking the ties.

The packed-chord design also has a number of advantages over conventional open-deck construction, namely, (1) the bolted, laminated stringers develop more strength and are of a more rigid type construction; (2) packed-chord trestles stay tight and require less tightening of bolts; (3) stringers in open-deck trestles, even when spaced 4½ in. apart, cannot be easily inspected, and by packing the stringers need for inspecting them is eliminated; (4) packed-chord trestles will pass drift during periods of high water more readily than open-deck trestles with conventional chords; (5) 8-ft. ties can be used with the four-ply packed chords instead of the 9-ft. ties otherwise required; and (6) the packed chords are much slower burning in event of fire.

As protective measures against fire we are providing concrete firewalls on the longer trestles and are also, to a large extent, fireproofing the surfaces of ties and timber guard rails. The method employed for the latter purpose involves use of an emulsified asbestos fibercoating, in which is embedded fine crushed rock. It costs about $1 per lin. ft. of bridge, and has proved very effective.

Where fires have occurred in packed-chord bridges, damage to stringers has been confined to outside faces of the packed chords. When fire breaks out in conventional open-deck trestles in which spacers are used between the stringers, the spaces seem to act as chimneys and form drafts which cause it to spread more rapidly. Although several packed-chord trestles have been on fire, none has been damaged to the extent trains could not pass over it after a few of the ties had been replaced. Last year about 750 ft. of a packed-chord bridge burned for six or seven hours before the fire was extinguished by 15 track men carrying water in buckets. After the fire it was necessary only to replace a few lengths of rail and renew some of the ties before allowing trains to pass. Some of the stringers were charred, but none damaged badly enough to require replacement when the permanent repairs were made.

I have been asked many times: "How do you know just what is taking place between the packed stringers?" To find out we have removed several panels from bridges that have been in service 15 to 16 years, and dismantled them for close inspection at our wood preserving plant. We found the inside surfaces to be free of decay and generally free of dirt or other foreign matter. The creosote and oil from the treatment tends to seal cracks between stringers, and the pitch on top of the stringers, together with the ties and spacer blocks, does a good job in keeping out both dirt and moisture.

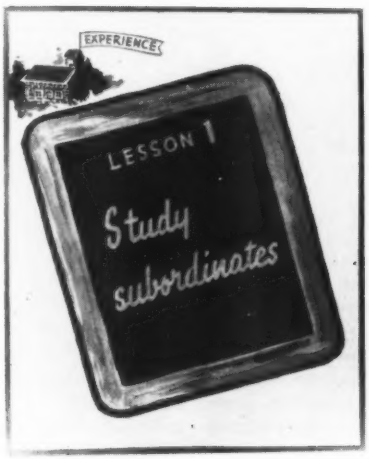
How to be a
Successful Supervisor

By HARVEY C. MARMADUKE
Representative, Executive Department
Illinois Central, Chicago

Based on a long and careful study of the requirements of a good supervisor Mr. Marmaduke has developed a lecture which he is presenting before interested groups both on and off the Illinois Central. Given here is an abstract of the lecture, accompanied by reproductions of some of the charts, or visual aids, by means of which he emphasizes his principal points.

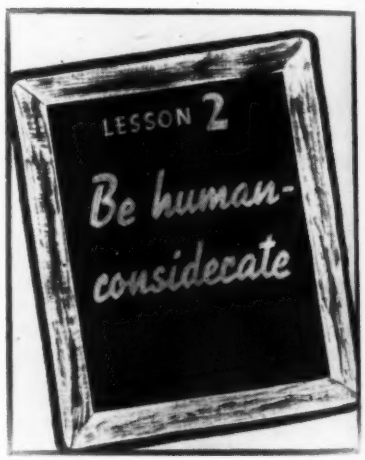
• It has long been my feeling that too little time and down-to-earth thinking have been devoted to keeping the personal development of people in industry apace with technological progress. This feeling encouraged me to develop this presentation, which is entitled, "Super-Vision for Supervision." It is an account of my observations and experiences as well as the experiences of others, garnered in more than forty years in the business world. I hope it will prove inspirational to new and old supervisors alike.

What can be done to help men in positions of responsibility to acquire the super-vision they need as supervisors and leaders of people? My feeling is that the positive approach is to encourage the supervisor to study the lessons learned by his predecessors in the school of experience. There are



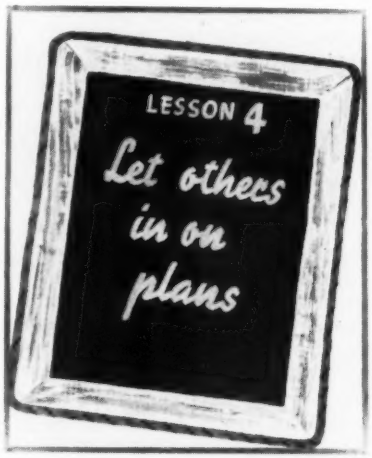
A capable boss searches for qualities in his workers that make them "tick"

Taking the measure of a man is a "must" if he is to work at peak efficiency

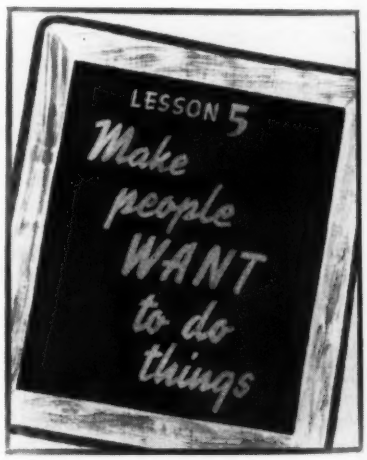


Warm relationships, born of being human and considerate, are a necessary goal

It would be a mistake to lead the band and try to play all of the instruments



If others are allowed to take part in making changes things will go smoothly



Mark of a true leader is that he makes his workers want to follow his wishes

five principal lessons to be learned, namely, (1) study subordinates, (2) be human and considerate of others, (3) delegate responsibility, (4) let others in on plans, and (5) make people want to do things.

Let's analyze these lessons one by one. For Lesson No. 1, study subordinates, our artist (see one of the charts) shows a supervisor literally taking the measure of a worker. If we are to get things done through people a continuous study of people is a "must" because they vary so widely.

Studying those around us will reveal that praise may spur one person to great heights. It may only inflate another. Constructive criticism is a tonic for another. There are those, too who do not respond to either criticism or praise. The capable boss, in my opinion, hunts for the things that make his workers "tick," the things that will move them to greater heights of effectiveness. He searches beyond the immediate work situation, too, because people's motives and attitudes are conditioned by personal history and home life.

The supervisor will find that developing others to succeed him will redound to his credit. He should not get the silly notion that a supervisor must smother the abilities of others to succeed. I think it works just the opposite, and the degree to which we develop those around us reflects our own leadership abilities.

The supervisor's goal should be to become a builder of men. I like to think of three men in my own experience who greatly influenced my life. The first man was the type who didn't want to use our ingenuity. He wanted to do all the thinking. He didn't want us to change a "t" or an "i". He never let us in on anything that went on or was going to happen. He seemed to be afraid to let us learn enough about the department to be of any real assistance to him.

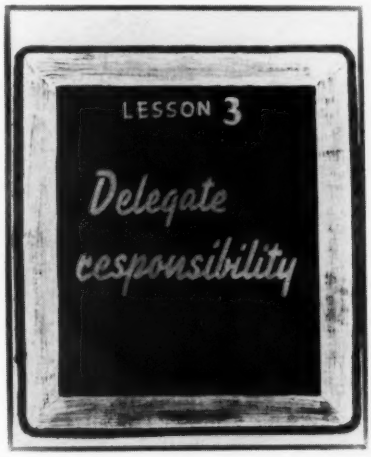
The second fellow started at eight o'clock in the morning to put jobs on top of the bookcase to be done after supper or on Sunday. He showed a great lack of organization ability.

The last of the three was dishonest. I don't mean that he would take the silver out of my pocket. He was dishonest in another way. He would make slight changes in the work of subordinates to get the credit for himself. He never took the trouble to find out whether a man's ideas were good. Everything had to be changed to put him in the best light with his bosses.

As I was coming along as a young fellow I saw nothing in

Studying and commending a worker can bring surprising results and changes

The considerate supervisor takes a sincere interest in the workers' problems



Learning to delegate responsibility is an important requisite of a good boss

Men who are led, not driven, are more apt to show a desire to help the boss

The highest compliment a boss can earn is to be known as a "builder of men"

Give praise often, and in public, but criticism should be a private matter

these three men that I could copy and become a successful supervisor. This became more apparent as the years went along, and I came to the conclusion that a good plan for me to follow with any problem that arose would be to analyze it and think how these three men would have handled it and then do just the opposite.

The point, whether we recognize it or not, is that our workers and younger supervisors are using us as models. What we do and what we are has an important bearing on the lives of those we work with. So let's remember that the greatest compliment one can earn is to be known as "a builder of men."

How To Be Human

The keystone to building such a reputation is to be human in everyday situations. (Note the chart picturing a supervisor first studying and then commending a worker.) This should be true in all our contacts with those above us and below us. In other words, live the Golden Rule. Unfortunately, we all are not warm-hearted by nature. It is hard for us even to be cordial to certain people and they in turn with us. We must recognize this and take steps to develop warm relationships with those around us. How? I do not know of a set formula. Among the accepted devices are to use first names, discuss hobbies and not too personal family matters and help workers over the rough spots. Sincere moves of this sort will pay dividends in friendship as well as in accomplishment.

The supervisor must learn to like people and seize every opportunity to take a sincere interest in the problems of his associates. This means that he will be considerate, which is the essence of being human.

Every - day consideration of others is reflected in the little things we do. The considerate boss is courteous to his workers and fellow supervisors. He makes his wishes known by requests or suggestions. He puts himself in the places of workers when making decisions affecting them. He treats their pride, personalities and self-respect as assets.

If it is necessary for a supervisor to criticize a subordinate this should be done in private, not in public. And most important, make the criticism constructive! On the other hand, praise should be given in public. Let the worker know how he is doing. Praise often, but sincerely! Never fail to recognize and give credit to the one who is responsible.

A most important part of a supervisor's development is learning to delegate responsibility. Never try to lead the band and play all the instruments.

Important to the successful delegation of responsibility are (1) spelling out responsibility in a clear-cut manner, (2) fixing limits of authority, (3) keeping control, and (4) fixing standards. Delegating responsibility is a "must," and we are not good supervisors if we don't delegate, just as a man is not a good machinist if he cannot overhaul a machine. Unfortunately, this rule is frequently violated, with serious consequences.

Books Will Help

Mr. Marmaduke believes that the reading of good books is essential to being a successful supervisor. Three books that he has found particularly helpful are: "Developing Your Executive Ability," by Howard Smith; "Management Can Be Human," by Harvey Stowers; and "How to Avoid Work," by Dr. William J. Reilly.

The fourth lesson from the school of experience is the importance of letting others in on plans and programs. Of course there are certain things that cannot be discussed too far in advance. However, it is a good plan to discuss changes with those concerned before they are in final form. This makes them a part of the plans. Let others have a part in making changes and things will go smoother because they will assume a certain amount of personal responsibility for the success of the plan or program. Above all, give courteous hearing to the ideas of others.

I wish to emphasize that the supervisor should temper his decisions with the ideas of others. No one expects the boss to be infallible. He must be willing to change his mind. If he is wrong, admitting it will cause others to gain confidence in his fairness and honesty. Once subordinates know that the boss truly wants their thinking and ideas, they will be eager to help.

That brings us to the last of our five lessons—make people want to do things. What we must learn here is best said in the words of an eminent authority: "Workers want a boss who uses a baton—not a club. They want to be led—not driven. Some supervisors still believe the only way to get workers to do what they want them to do is to drive them. The 'get going, I'm boss—you'll do it my way or else' method will erase the supervisor from the business map faster than any other mistake he might make."

It is necessary to learn the true meaning of the word leadership. People do things reluctantly for the driver because he forces them, but enthusiastically for the true leader because he makes them want to follow his wishes. Frankly, I feel that following the previous lessons will make the accomplishment of this one a matter of course.

I wonder if it isn't a good idea for us all to make a mental check of ourselves once in awhile. I wonder if, as supervisors, we shouldn't stand up and take a walk around ourselves and see if we really are measuring up to the standards set for us. Are we alert and fair-minded? Are we developing our leadership abilities? I firmly believe that we all can benefit from a good, long look of self-appraisal.

Super-Vision Prescribed

If I were a great oculist, I think I could give people "super-vision" by prescribing a pair of bifocal glasses with the distance vision for looking ahead, for planning, and the short vision for the job to be done here and now. Of course he would be cautioned not to work with the vision out of focus.

Here are the ingredients I think I would write into this prescription. I would recommend that humanness, consideration and kindness be ground into the lenses. Then there would be an ingredient that would give the ability to delegate responsibility, and we could see the value of studying subordinates and letting others in on plans and programs.

Finally, I would have them grind into those lenses a permanent reminder that a good leader cracks no whip—jabs no needle. He gets things done through people by making people want to do things. These glasses, then, would give "super-vision" and insure a bright future.

The hydraulic ram is reported to exert enough force to push the most stubborn tie

Machine Removes A Tie a Minute

• Mechanization of one important phase of tie-renewal work—removing the old ties—is accomplished through the use of a new machine, known as the W68 Series A Tie Remover, recently introduced by Fairmont Railway Motors, Inc., Fairmont, Minn. With this machine it is reported that two men, without digging at the tie ends or without raising the track, can remove ties from the track at a rate as high as a tie a minute.

The power for removing ties is supplied by a lateral hydraulic ram equipped at its outer end with two teeth. When the ram is extended the teeth bite into the tie and force it through the shoulder ballast. When the ram reaches the limit of its movement, it is retracted, and another grip is taken on the tie. Under normal conditions only three strokes of the ram are necessary to push a tie completely out from under both rails. The maximum force exerted by the ram is 16,000 lb., which is reported to be sufficient to push the most stubborn tie, regardless of the type of ballast.

The ram is swivel-mounted on a steel frame which, during a tie-pushing cycle, rests on one rail and is fastened to it by a lever-operated rail clamp. The reaction of the pushing force of the ram is balanced by two chains hooked to the opposite rail, one at each side of the tie being pushed.

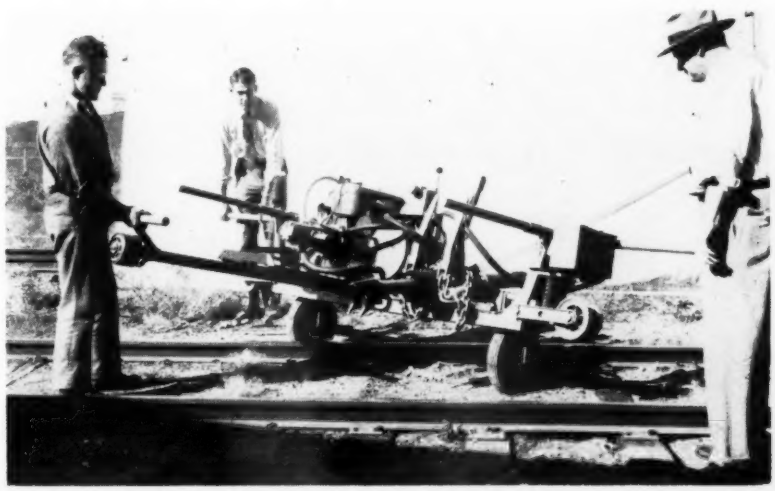
In moving from tie to tie the unit is raised by a separate hydraulic system until its weight is carried on two double-flanged wheels running on one of the rails. Balance is provided by an axle extending across the track and terminating in a third wheel running on the opposite rail.

Equipped with Set-Off Wheels

The frame also carries the hydraulic pump and its power unit —a two-cylinder, four-cycle gasoline engine—and is equipped with two pneumatic-tired set off wheels. When necessary to remove the machine from the track, it is first elevated until it rests on the rail wheels. Next the set-off wheels are swung down and locked with spring-loaded plungers. Finally the rail wheels are retracted until the load rests on the set-off wheels. Then, with the aid of lift pipes, the machine can easily be rolled into the clear. A sliding base for the engine and pump unit centers the load over the set-off wheels for better balance.

In operating the machine one man guides the ram and operates the control valve. He also releases and tightens the rail clamp and raises and lowers the machine with respect to the rail wheels when moving from tie to tie. The other man places and removes the rail hooks that anchor the machine to the opposite rail. For easy placement and removal these hooks have cam-type connections with the chains to give the necessary slack.

This company now has under development a tie-insertion machine as a companion unit for the tie remover.



Easy maneuverability is provided by two retractable pneumatic-tired set-off wheels

Texas & Pacific Is

Modernizing Stations on L

Beginning in 1947 this road has renovated an average of more than two old passenger stations annually and plans to continue the program indefinitely as warranted by business and financial conditions. The general pattern of the modernization work, with reference to special features of particular stations, is described herein.

• With the objective of cultivating the goodwill and respect of the public, and also with the thought that the morale of the employees directly involved is favorably affected, the Texas & Pacific has been carrying out a long-range program for the improvement of its passenger stations. This program was started in 1947 and to date has resulted in the modernization of seven stations, with one additional structure slated to be modernized in 1950. In addition, one new passenger station has been built during this period to replace an obsolete structure.

During the first year of the program, work on three stations was undertaken, namely, those at Colorado City, Baird and Sherman. All these points, as well as the others involved in the modernization program to date, are located in Texas. In 1948, work was undertaken on the stations at Denton, Gladewater and Grand Saline. In 1949 the road undertook the remodeling of its station at Odessa, and the construction of a new station at Midland. During the present year the station at Mineola is scheduled for modernization.

The stations at all these points are either small or moderate in size. Those at Sherman, Gladewater, Grand Saline and Odessa were largely of frame construction, with gable roofs, while the stations at Baird, Denton and Mineola had brick exteriors. The station at Colorado City had a sandstone exterior.

Seeks Modern Exteriors

To a considerable extent the work done on all of the stations has followed a common pattern, especially with reference to the frame structures. Changes made on the exteriors of the stations are designed to give them a modern, clean-cut appearance with unbroken lines wherever possible. This means that all unnecessary protuberances and "gingerbread" are removed. The undersides of overhanging eaves are usually enclosed with asbestos - cement boards, and concealed flush-type fixtures are installed under the overhang where exterior lighting is desired. New and larger windows are generally installed, and, where lacking, an entrance door is placed in the street side of the waiting room. This is done not only for the convenience of patrons, but also to enhance the importance of the structure in the eyes of the townspeople. It is also felt that the presence of a door in the street side of a station provides an opportunity to introduce various decorative features, such as lighting fixtures, flanking glass panels, flower boxes, etc. Generally, in modernizing the exteriors of the frame stations, the walls are covered with asbestos-cement shingles above a wainscot of brick veneer or wood drop siding.

Formerly, the platform areas around most of these stations were surfaced with chats, but in the modernization work such areas are paved with either concrete or asphalt. Unimproved areas immediately adjacent to the stations have also come in for attention. In an effort to improve the appearance of these areas the railroad has endeavored, with considerable success at some locations, to interest local groups in a cooperative plan in which the road offers to landscape or grade the grounds if the local people will plant shrubs and flowers and care for them.

The work done on the interiors

The changes made on exteriors are designed to give a modern clean-cut appearance

Interior of Denton station features . . .

n Long-Range Basis

of the stations has generally been of a thorough - going nature, amounting to complete renovation, refinishing and redecorating. Sheetrock for the walls and metal-tile or oak wainscots are favored. Color schemes vary somewhat but rose-tan for the walls and blue for the metal wainscots are colors that have been used to a considerable extent. Panelled tile for the ceilings and asphalt tile for the floors, are materials commonly used in the renovated stations. The lighting fixtures in the waiting rooms and offices are usually of the fluorescent type, either recessed in, or hung close to, the ceiling.

Ticket Windows Eliminated

Along with the other renovation work the old-fashioned ticket windows have disappeared in place of open counters with built-in ticket cases underneath. It is felt that such counters are not only conducive to better relationships with patrons, but that they also tend to promote neater and more orderly habits on the part of the agents. Old-fashioned furnishings in the waiting rooms have given way to modern, comfortable wood settees. Usually the work has involved the

Right — Renovated interiors, such as the one at Colorado City shown here, feature open counters with built-in ticket cases below

Below—View of the modernized freight and passenger station at Sherman

. . . murals depicting city and school life

Improved station facilities have enhanced the goodwill and respect of the public

Dedications of revamped stations are often attended by business and civic leaders

replacement of existing heating facilities with individually-fired gas-steam vented heaters.

Another feature common to all of the station-modernization jobs has been the renovation of the sanitary facilities, including the installation of modern toilet fixtures. In refinishing toilet rooms the walls are covered with Sheetrock above black metal wainscots and the floors are either covered with asphalt tile or ceramic tile, depending on whether the original floor was wood or concrete.

The treatment given the station at Odessa is worthy of special mention. This station, which is a frame structure, has a freight room at one end. In the modernization work the passenger and freight facilities were separated from each other by cutting a 14-ft. section out of the building, leaving the roof intact. The exterior of the freight section was covered with cream colored asbestos-cement shingles above a wainscot of wood drop siding, while the passenger end was covered with cream colored brick above a wainscot of ashlar granite.

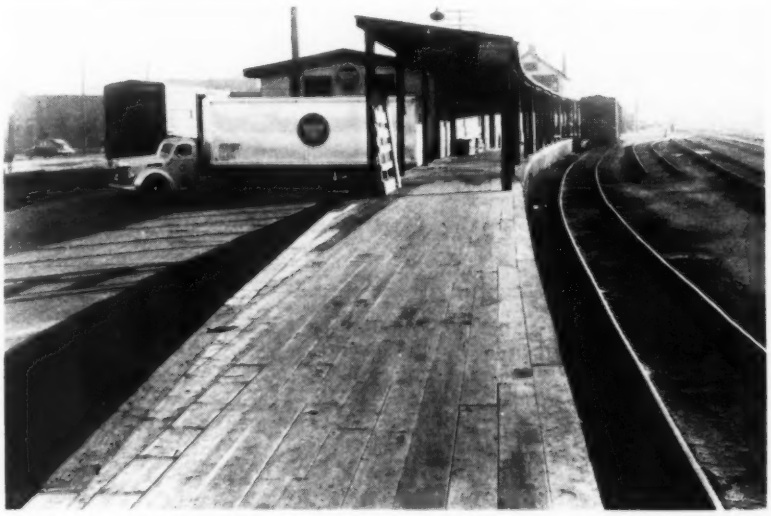
Murals for Denton Station

The interior of the station at Denton was also given special treatment. This station was subjected to the same general pattern of renovation on the interior as described above except that two opposite walls of the waiting room, above the wainscots, were covered with murals depicting local industries, and city and school life. Another special feature is the custom-built ranch-type settees and tables with which the waiting room is furnished. The fact that there are two colleges located at Denton is a partial explanation of the special treatment given this station. In addition to other work done on the exterior of the Denton station the existing brick walls were painted a cream color.

In remodeling the station at Mineola, to be done this year, the plan is to remove the old frame gable roof and to install a flat roof with parapets. A brick veneer is to be placed over the existing brick walls. In most other respects the work to be done at Mineola will conform generally to that described above for the other stations.

When the modernization work at a particular station is completed the practice of the railroad is to hold dedication ceremonies in which local persons of importance are asked to participate. The president of the road, W. G. Vollmer, is usually present and takes part in these affairs. Speaking of the road's station-modernization program, Mr. Vollmer comments that the "improved station facilities have not only enhanced the goodwill and respect of the public, but have a stimulating effect on the morale of the employees directly involved. I consider the money we have invested in our station-modernization program sound and profitable, and we propose to carry it forward to the extent that business and financial conditions warrant."

The station-modernization program is being carried out under the general supervision of R. J. Gammie, chief engineer of the road. All plans for the modernization work are prepared by the road's architect, S. G. Urban. The practice is to have the work done under contract.



"CLEAN" TREATMENT FOR PLATFORM DECKS—Recently the decks of various freighthouses and other platforms throughout the Missouri Pacific Lines were renewed with lumber pressure-treated with pentachlorophenol. At the same time, for comparative purposes, lumber treated with water-soluble salt was also installed in such structures. For the "penta" treatment a five-per cent solution in a light petroleum oil was used, and the formulation was selected to give a 6-lb. retention. The material was treated at the plant at North Little Rock, Ark., of the Wood Preserving Division of the Koppers Company, Inc. Shown here is the platform of the company's freighthouse at Poplar Bluff, Mo., the entire deck of which was renewed with the treated lumber. It is reported that the platform is clean and free of oil and residue.

Puts Gap in Drainage From Coach Hydrants

• At Alliance, Neb., the Chicago, Burlington & Quincy has introduced a distinct separation into the drains from its coach-watering platform and flush-type hydrants and the city sewer system into which they discharge, thereby bringing the coach-watering facilities at that point into conformity with the requirements of the U. S. Public Health Service. This was accomplished at a moderate cost by taking advantage of the proximity of existing steam- and air-supply lines, as well as the considerable lengths of the existing hydrant drains, to install a sump to receive the drainage from the hydrants from which it is pumped a relatively short distance with automatic equipment through an air gap and trap into the city sewer system.

Layout at Alliance

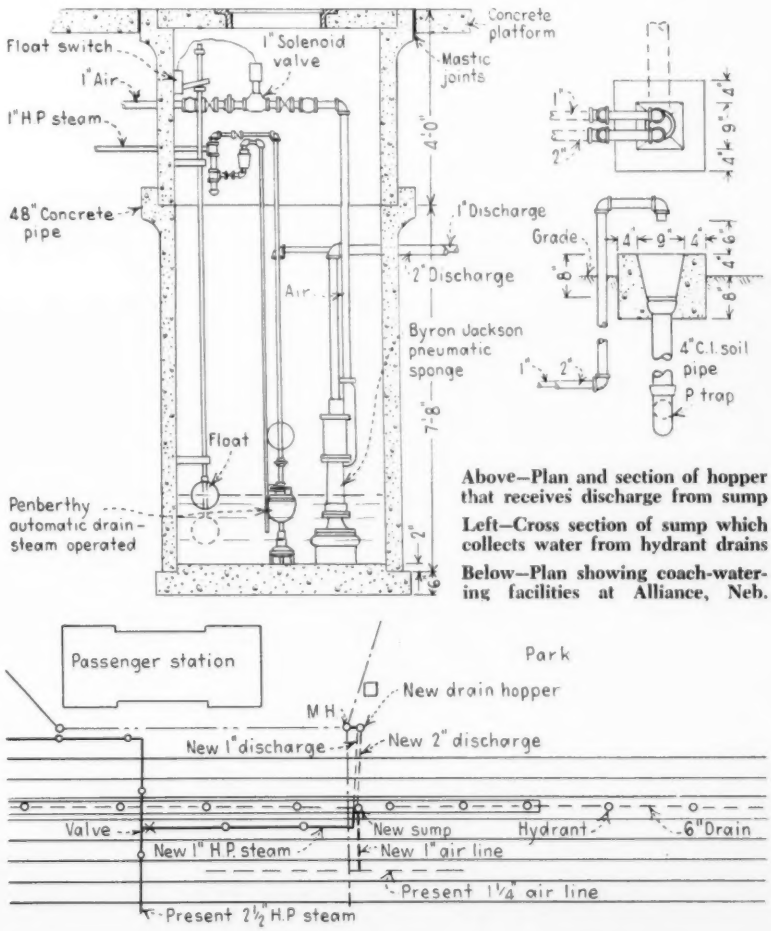
In the original installation at Alliance, an 8-in. city sewer crossed under the coach yard at an intermediate point, and the existing drain line was connected directly to this sewer from two directions. In revamping this set-up, the hydrant drain lines were disconnected from the sewer and connected with a new sump, made up of one and one-half lengths of 48-in. concrete pipe 8 ft. long, which was inserted in the hydrant drain lines a few feet away from the former connection with the sewer. On the floor of the sump, which is about 12 ft. below the top of the coach-yard platform and 1 ft. 6 in. below the outlets of the drains, a steam-operated Penberthy automatic drainer and a Byron-Jackson pneumatic sponge pump were installed.

To power this equipment, a new 1-in. high-pressure steam line was installed to connect the automatic drainer with an existing 2½-in. high-pressure steam line located approximately 160 ft. away, and a new 1-in. air line was laid to connect the pneumatic sponge pump with an existing 1¼-in. air-supply line nearby.

The automatic drainer discharges into a 1-in. pipe line and the pneumatic sponge pump discharges into a 2-in. pipe line. Both of these discharge lines were carried underground a distance of about 60 ft. where they rise above the ground to discharge through a 6-in. air gap into a small concrete hopper which was constructed alongside a manhole in the sewer line. The hopper drains through a P-trap into the manhole. The presence of the trap and the air gap preclude any sewage contamination of the water in the sump discharge lines.

Under ordinary conditions, the automatic drainer is sufficient to handle the waste water from the hydrant drains, but if an unusual amount of waste water should flow to the sump, the pneumatic sponge pump, activated by a float switch and solenoid valve, goes into action. Thus the latter pump is really a stand-by unit and, in addition, provides the sump with pumping units using two different kinds of power, so that one will continue to operate in the event that one of the power sources should fail. This is a requirement of the U. S. Public Health Service.

It is recognized on the Burlington that installations of this type at new coach-watering layouts would probably be prohibitive because of the cost, but that wherever conditions similar to those at Alliance exist, the plan is considered to offer a satisfactory solution to a vexing water-service problem. The installation described was made under the direct supervision of W. D. Gibson, water service engineer. The work was done by company forces under the direction of the division officers.



Above—Plan and section of hopper that receives discharge from sump

Left—Cross section of sump which collects water from hydrant drains

Below—Plan showing coach-watering facilities at Alliance, Neb.

Union Pacific Operates Biggest Ballast Pit

Each day at Granite Canon, Wyo., during loading season, 140 carloads of rock are quarried and crushed to produce ballast for this road

In this general view the quarry is shown at the left and . . .

● Ballast production on the Union Pacific is big business. To fulfill its requirements the road operates a ballast plant at Granite Canon, Wyo., 19 mi. west of Cheyenne, from early spring through the fall, which, with a capacity to produce more than a million tons of crushed rock annually, is reported to be the largest of its kind in the world. Manned by 75 employees and operating two eight-hour shifts each day during the heavy loading season, this plant can turn out as much as 7500 cu. yd., or about 140 carloads, daily. When operating only one eight-hour shift daily, production is about half this amount. Although ballast is the principal product of the plant, three other products are produced: rip-rap, chips for platforms and roadways, and waste, which is placed in bags and used for flood protection.

Layout of Plant

The ballast plant consists of a horseshoe-shaped quarry and a series of rock crushers, all situated on a 75-acre site. In the quarry the rock is periodically blasted from the quarry face and is loaded by two shovels, one electric and the other Diesel, into 10 dump trucks, which shuttle back and forth between the quarry and the crushing plant. The electric shovel has a capacity of 5 cu. yd., and the Diesel unit a capacity of 2½ cu. yd. As a safety precaution, a dragline, situated at the rim, plays an iron hook over the quarry face to dislodge loose masses of rock that otherwise might fall unexpectedly.

The rock moved out of the quarry is dumped into the first of two primary crushers — a 42-in. McCully unit. Then after passing through a set of grizzlies for dirt removal, the rock drops into the second primary crusher, a 7-ft. Symons unit, from which the crushed rock is carried by a conveyor belt to a

These 2 shovels keep 10 trucks busy hauling rock to crushers. Note the dragline on the rim at the upper right-hand corner, which plays a hook over the quarry face to dislodge loose rock

After passing through first 2 crushers, rock is dumped into a surge pile. Through an outlet in bottom of this pile material passes onto belt line that carries it to 3 more crushers

. . . the crushing plant above. The tube-like structures angling between the buildings house the conveyor belts which carry the rock

surge pile, completing the first crushing phase.

Through a hole in the bottom of the surge pile the rock is dumped onto a conveyor belt that carries it to the first of three successively smaller Symons crushers. The finished ballast, after leaving the secondary crushers, is weighed and then carried on conveyor belts to a 60,000 cu. yd. storage area. A final conveyor belt transports the ballast from the storage pile to two car-loading tipples, each with two chutes. The reason for dividing the rock crushing into primary and secondary phases, separated by a surge pile, is to enable either set of crushers to operate while the other is shut down for repairs.

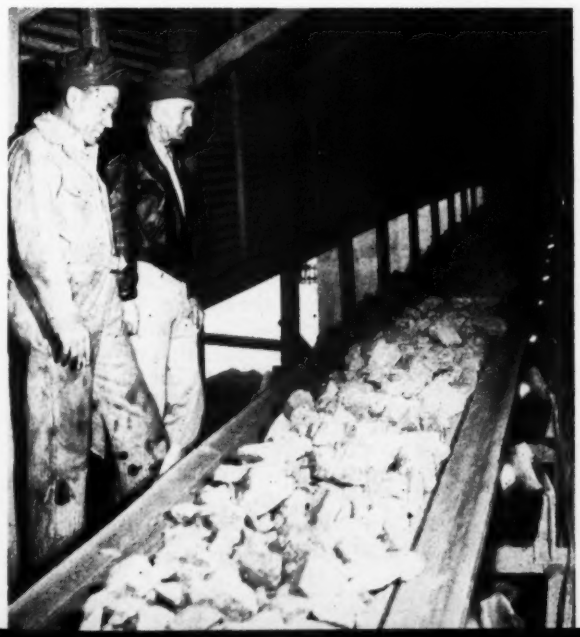
Moving the rock through the various operations requires 22 conveyor belts totaling 6,500 ft. in length. The belts, of rubber construction, are of three widths: 42 in., 36 in., and 24 in., the belts narrowing down as the rock material becomes finer.

Major Equipment

In addition to the shovels and trucks at Granite Canon, the major equipment includes three crawler tractors, two slusher trucks, two portable welding trucks, 12 stationary electric welders, two flat-bed trucks, five pick-up trucks, four draglines, a 2,000-cu. ft. stationary air compressor, a 500-cu. ft. portable air compressor, a 500-cu. ft stationary air pump, and a 750-cu. ft. stationary air pump. The plant has its own machine shop and warehouses, and obtains its power through a 13,000-volt line from Cheyenne.

Relatively new, the ballast plant was placed in service in February, 1945. It is being operated for the Union Pacific by the Morrison-Knudson Construction Company. The road's supervisor at the quarry is Ray Farrell.

The movements of all rock within the crushing plant is by conveyor belts, such as the one shown below. The total length of the 22 belts in operation at the plant is about 6,500 lin. ft.



These tipples mark the end of the ballast production line at the Granite Canon plant. From them about 140 cars of finished ballast are loaded each day during the heavy loading season

Clearing Brush With C

Using a small gang equipped with powered equipment in addition to the usual hand tools, the C.&E.I. systematically fights the encroachment of bushes and saplings on its right of way where growth is most troublesome

Above—This Ingersoll-Rand Model DR-60 air-compressor outfit, with an auxiliary reservoir tank, was used to power the pneumatic chain saw shown at right, which is being operated by 2 men while a third man forestalls pinching

Above—This Jackson Model M-2 portable power plant was used to supply current for an electric saw

Right—Trees at fence line, with fence wires buried in the trunks, were topped at fence-post height

• About 60 miles of the main line of the Chicago & Eastern Illinois between Marion, Ill., and Thebes, runs through what is known on the railroad as "brush country". There, conditions are such as to encourage the rapid growth of brush and saplings and, if not cut, these growths soon overrun the right of way, foul the telephone and telegraph wires, causing loss of current potential, and sometimes, after bad sleet storms, saplings and tree branches, weighted with ice, may overhang the track area, presenting a hazard to the cab windows of passing Diesel locomotives. In coping with this problem, the railroad uses a brush-cutting gang equipped with power chain saws, in addition to the usual brush-cutting hand tools. Utilization of the power equipment not only expedites the work but also results in year-'round usage of the power plants and chain saws.

The territory between Marion and Thebes is subject to inundation by the overflow waters from both the Ohio and the Cache rivers every spring season. The flood waters back up for a considerable distance and stand not only in the swampy lowlands but also in the railroad borrow pits until dissipated by evaporation during the summer months. Thus stimulated by a plentiful supply of moisture, the growth of vegetation and woody plants is rapid, particularly wild cherry, sycamore, elm, cypress, sassafras, honey locust and black walnut. Because of the swampy terrain, owners of land adjacent to the railroad right of way either find it too difficult or are disinclined to cut the brush on their properties with the result that these plants are constantly encroaching upon the right of way.

Years ago the C. & E.I. set up a systematic program for cutting the brush in the most troublesome area with a gang of about 16 men

h Chain Saws

Right of way on pole-line side is cleared of all brush from track area to fence line

equipped with brush hooks, axes and hand saws. Generally, this work was commenced about the first of December, when the summer track work had been completed, and continued until about the first of March, when track work again demanded the services of these men. Although the railroad recognized the fact that cutting brush might be more effective if done during the season when the plants were in full growth, with much of the sap above the ground, the period decided upon for this work offered a means of keeping the men in continuous employment without slighting essential track work.

The brush-cutting gang cleared the right of way of all brush, trees and saplings between the track and the right-of-way fence on the pole-line side only, and covered about 15 mi. each year. On the opposite side of the right of way, only the growth close to the track area could be cut during the time allotted. With this program, the brush on the pole side of the right of way was cut at least once every four years, but the interval provided sufficient time for some saplings to attain a substantial growth so that axes had to be used instead of brush hooks; when this was necessary the work was more difficult and progressed slowly.

Later the gang was furnished with a wheel-mounted saw of the circular-blade type to eliminate the hand axes and to speed up the work. However, the machine that was used had considerable vibration with the result that, during thaws, the wheels sank into the softened earth, causing the blade to become pinched in the cut, in which event the blade had to be withdrawn and a new cut made.

Starts Use of Chain Saws

During the recent brush-cutting season the railroad decided to make use of chain saws and two of its idle power units for this work. One of the power plants assigned to the work was a Jackson portable unit, Model M-2, with a rated capacity of 2.5 kva. of 115-volt, 60-cycle current, while the other was an Ingersoll-Rand Model DR-60 compressor. Both of these power plants are of the wheel-mounted type so that they can easily be moved along the embankment shoulder as required. Also, when once started, these units require no attention, so that all the men can devote their full time to the cutting work.

The work during the past season involved the use of two chain saws, both being Mall two-man units with 36-in. working capacities. One, electric-powered and known as Model 424, was a 1½-hp. unit working on 115-volt, 21-amp. current; the other, air-powered, and known as Model 224, operated at a working air pressure of 90 lb. per sq. in. Both power plants are used for tie-tamping work during the working season. When used for brush-cutting purposes, a 125-ft. extension cord and a 150-ft. air hose line were furnished to allow a considerable range of movements from each spotting of the power plants. Other equipment consisted of motor cars, brush hooks, hand saws, axes, hatchets and pike poles.

Gang Personnel

The personnel of the gang consisted of 12 men and a foreman. The men, recruited locally, were generally laborers who spend the summer seasons working on the road's section gangs. Three men were assigned to each power saw—two men operating the saw and the third man pushing, either with his arms or with a pike pole, against the upper trunk of the tree to avoid pinching the saw and to make the tree fall in the desired direction. The other six men of the gang worked with brush hooks ahead of the sawing teams. All trees three inches in diameter and larger were cut by the power saws, while trees under this size and brush were cut with brush hooks.

The average progress of the brush-cutting gang was about a quarter mile per day on the pole side of the right of way, and whatever work could be done in addition in clearing away the brush on the opposite side close to the track. After felling, the trees were stripped by axemen and the larger trunks were cut into lengths that could be handled manually. The cut material was left in small piles on the ground to dry out so that it could be burned later in the year. Many large trees were found growing at the fence line and with the fence wired buried in the trunks. Whereas it would be difficult to remove such trees with axes, they were easily topped at fence-post height with the chain saws without the necessity of disturbing the fence.

All too frequently thawing snow and flood waters from the rivers make it necessary for the men to work in hip boots. However, when using the power saws the difficulties of working under such conditions are minimized. Generally speaking the procedure when water is present is to use the electric-powered saw to clear the embankment slopes, and the air-powered saw to clear the inundated portion of the right of way.

Using the chain saws the gang had no difficulty in carrying out the programmed 15 mi. of clearing work in the 90-day working period. Without the chain saws, it is estimated that the gang would have to be about a third larger to accomplish the same amount of work.

Charts Aid Selection of Cu

The rational selection of a drainage structure that will pass storm-water runoff through an embankment is a problem demanding considerable skill, experience and judgment on the part of railway engineering departments. In this article Mr. Ausband presents a graphical method of determining culvert sizes, which gives a clear picture of all the complex variables that must be evaluated and which leads to solutions that can be applied with confidence and security.

By G. A. AUSBAND, JR.
Assistant Engineer, Southern
Charlotte, N. C.

• It is well known that the selection of a drainage structure for passing storm-water runoff through an embankment is an engineering problem which cannot be solved with mathematical precision; too many variables are involved which defy exact definition and which can form an infinite variety of combinations. Therefore, those concerned with the problem must take recourse in empirical or rational formulas developed from a large number of observations of culverts which have proved adequate to carry the runoffs from drainage areas of many different characteristics. There are many such formulas, ranging from the simplified equations which relate the sizes of culvert openings directly with the areas of watersheds, to the more accurate, but more complex, rational formulas.

Over a period of several years the writer has given considerable study to the hydraulics of drainage areas and culvert design. Out of this has evolved a graphical method of determining culvert sizes—illustrated by the accompanying chart. This method is general in application, is easy to apply and lends itself to the latest concepts in drainage-area hydrology. The writer believes that no other method of drainage—area analysis can give such a clear picture of the complex variables that must be evaluated. Furthermore, since the solution depends only on visual inspection of the chart, greater opportunity is afforded to explore the broad matters of policy and economics pertinent to types and sizes of drainage structures. A working chart similar to the one presented here can be prepared in less than an hour and the time spent is more than compensated for by the confidence and security that derives from a rational design.

Burkli-Ziegler Formula

In the preparation of the chart used to illustrate the graphical method, the Burkli-Ziegler formula giving the rate of storm-water runoff has been used. There are many others that may serve as well. The reader is warned, however, against the use of the simplified formulas that relate the area of the waterway directly to the size of the watershed unless he understands the limitations of their use. The hydraulics of drainage areas and the hydraulics of culverts present such widely different problems that it is a far departure from the rational method to attempt to relate the two in a single formula.

The Burkli-Ziegler formula is as follows:

$$Q = CRA^{3/4} S^{1/4}$$

in which Q=Runoff in cubic feet per second.
C=A constant that varies with the character of the surface or the soil in the area.
R=Rainfall intensity in inches per hour.
A=Size of the drainage area in acres.
S=Average slope along the stream or course of the storm water in feet per 1,000 ft.

The terms A and S may be determined in the field by the usual surveying methods to any desired degree of accuracy. A value of R is chosen that is consistent with the time required for a particle of water to travel from the farthest reaches of the drainage area to the concentration point. Reliable rainfall data have been collected for short average storms and for maximum storms over most of the United States. Short storm precipitation rates in excess of 6 in. per hr. are not uncommon; rates up to 8 in. per hr. have been recorded. The economics of culvert-size determination usually require that the upper and lower limits of R be established and considered on the basis of frequency.

This leaves only C to be assigned a value. This is done by first classifying the terrain as woodland, grass land, improved districts, streets and paved areas, etc., and then obtaining the proper numerical constant from a text or handbook. In addition to the conventional notion of C, however, it is essential that it be regarded from the viewpoint of several newer concepts that have proved valid in drainage area hydrology. For instance, runoff is influenced by the proportion of rainfall that will infiltrate into the soil, a factor which varies with the condition of vegetal cover and land use. This should be given careful study, particularly if the farming season coincides with the season of maximum storms. C must also be regarded as a factor depending on the possibility of closely recurring storms. It has been frequently observed, for example, that the storm which taxes a waterway most severely is one which follows closely upon an antecedent storm that had already brought the soil-water content to near capacity. Thus C is a composite factor that can be made to reflect any condition of drainage-area hydrology.

Plotting the Chart

In the example illustrated by the accompanying chart the size of the drainage area (A) and its slope (S) were determined by usual survey methods to be 400 acres and 40 ft. per 1,000 ft., respectively. When these values are substituted in the Burkli-Ziegler formula the latter becomes:

$$Q = 225\ CR$$

This form of the formula is a linear equation, the graph of which is a straight line.

The time of concentration for this particular area was established by field observation to be about 15 min. The storm intensity-duration data given in any of several handbooks (Myers Hydrology is an excellent one) indicated that the maximum rate of precipitation for a 15-min. storm is about 8 in. per hour and that the lower limit for storms of average intensity is about 4 in. per hour. Substituting

Culvert Sizes

these values of R in the Burkli-Ziegler formula, the following equations are formed:

Q=1800 C (for rainfall of 8 in. per hr.)
Q= 900 C (for rainfall of 4 in. per hr.)

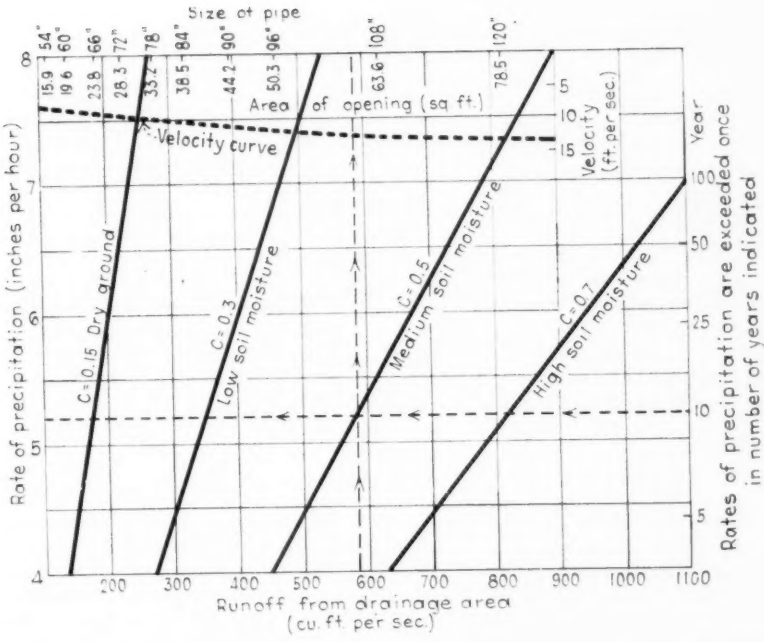
Next there was substituted in these equations a value of C based on conventional factors, in this case 0.15 to represent wooded land. By so doing the runoff (Q) was found to be 270 cu. ft. per sec. for a rainfall intensity of 8 in. per hr. and 135 cu. ft. per sec. for 4 in. per hr. These values were plotted on the chart and connected with a straight line. This is the line on the chart marked C = 0.15.

In the drainage area studied the factor of vegetal cover and land use was one not likely to vary; the soil was poor and rocky and covered with scrubby timber. Observations indicated, however, that the runoff would vary greatly with the conditions of antecedent weather, or the degree of soil saturation that prevailed prior to the calculated storm. This concept of C was used to plot the other three Q lines shown on the graph and marked: C = 0.3 for low soil moisture; C = 0.5 for medium soil mositure; and C = 0.7 for high soil moisture.

The frequencies in which the rates of rainfall within the limits of the chart will occur, or, in other words, the number of years which will elapse before any selected rate of rainfall is exceeded once, are shown in the scale at the right margin of the chart These frequencies may be obtained from reliable formulas, statistical data or handbooks on hydrology. This part of the chart is indispensable for determining at sight the probalities of high rates of rainfall, a factor which is of first importance in the economies of culvert design.

The scale designating the size of the culvert, appearing at the top of the chart, was obtained from the Handbook of Culvert and Drainage Practice, published by the Armco Culvert Manufacturers Association. It is based on the law of critical flow as stated in Hydraulics of the Miami Flood Control Project, by Sherman M. Woodward. The law states, in effect, that the discharge capacity of a culvert increases (exponentially) with the culvert slope until a certain critical grade is reached, beyond which there is no further increase in discharge. In other words, increasing the slope of a culvert beyond the critical value merely causes the water to flow with less depth and greater velocity.

This scale may also be used to determine the sizes of box culverts if it is borne in mind that a square culvert whose side dimension is equal to the diameter of a round pipe will carry about 13 per cent more water than the latter.


Size of pipe
15.9 19.6 23.8 28.3 33.2 38.5 44.2 50.3 63.6 78.5
54" 60" 66" 72" 78" 84" 90" 96" 108" 120"
Area of opening (sq ft.)
Velocity curve
Velocity (ft. per sec.)
Rate of precipitation (inches per hour)
C=0.15 Dry ground
C=0.3 Low soil moisture
C=0.5 Medium soil moisture
C=0.7 High soil moisture
Year
Rates of precipitation are exceeded once in number of years indicated
Runoff from drainage area (cu. ft. per sec.)

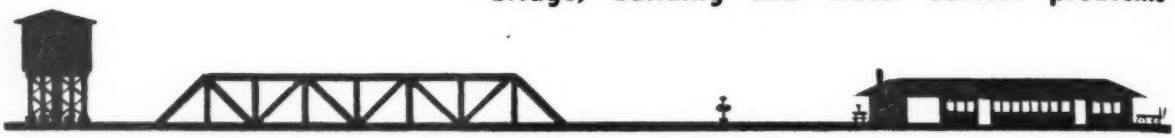
Above—This graph of the Burkli-Ziegler formula is plotted for a drainage area of 400 acres and a slope of 40 ft. per 1000 ft. From a chart of this kind the proper size of a drainage structure such as the Armco Multi-Plate culvert shown at right, can be confidently determined

Analyzing the Chart

As an example to illustrate how the chart is used in drainage area analysis, assume that a rate of rainfall (5.2 in. per hr.) is selected that will be exceeded once in 10 years. Moving horizontally to the left a line would intersect the C = 0.5 graph at a point corresponding to a discharge of 585 cu. ft. per sec. If this point of intersection is projected vertically to the top of the chart, it will be seen that this discharge will require a 108-in. pipe. A pipe of this size, however, will be required only if the 5.2-in. per hr. storm is assumed to follow a condition of antecedent weather that has caused a fairly wet soil condition. If it is assumed that such a storm is likely to fall only on a soil with a low moisture content (C = 0.3), a smaller pipe, 90 in., could be selected. The same storm falling on dry ground (C = 0.15) could be conveyed by a 66-in. pipe. Thus, by using a chart of this kind for drainage area analysis, all possible factors and combinations can be quickly considered and the most rational solution easily obtained.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



To Weld or Crop Rail Ends?

Under what circumstances, if any, is it more advantageous to crop rail than to build up the rail ends by welding? Why?

Crop, If Welding Unjustified

By J. E. SHAW

Roadmaster, Southern Pacific Lines in Texas & Louisiana, Houston, Tex.

Rail should be cropped only when it is apparent that building up the rail ends by welding will not satisfactorily eliminate undesirable conditions, and when the remaining service life of the rail will justify the expenditure for labor and additional joint fastenings, and the loss of metal.

If the rails are stock piled and are to be put back in service in primary or secondary main tracks on which the speeds and maintenance requirements are relatively high, there are several interdependent conditions that, having reached a critical point, could not be satisfactorily eliminated by welding. Some of the conditions, in order of importance, are: (1) Wear of the surfaces where contact is made with the anglebars; (2) permanent deflection in the rail near the end; and (3) the length and depth of the batter.

If the rails are in service, and conditions mentioned in the preceding paragraph obtain to a critical degree, there are several additional advantages to be realized by cropping the rail. A large percentage of the anglebars can be reused when reapplied where the rail is of full section. By moving the joints to new locations it will be possible to continue the ties and ballast at the old joint locations in service several years longer than could otherwise be expected, because, due to the excessive impact resulting from the battered joints, mechanical destruction of the ties and pumping of the ballast under and near the joint will be rather severe. The savings in track material and maintenance over a period of several years will more than compensate for the additional expense incurred by cropping the rail under traffic.

Weld as Long as Economical

By C. L. WATERBURY

Supervising Engineer, Roadway Equipment & Welding, Chicago, Milwaukee, St. Paul & Pacific, Chicago

It is quite generally economical to build up battered or chipped rail ends in track by welding for three reasons: (1) To increase the service life of the rail between rail-laying jobs; (2) to retain the maximum amount of the rail in service; and (3) to maintain the original 39-ft. rail lengths.

When rail is cropped, it is desirable to end-harden the cropped ends—an expense that is eliminated if cropping can be avoided. Proper maintenance of joints by surfacing, tie renewals, bolt tightening and joint-bar renewals, as required, will extend the service life of rail before cropping becomes necessary or justified.

Because of neglect through the depression years or overloading by heavier power, much old rail has become so worn that it can no longer be maintained by welding for one or more of the following reasons:

(1) Loose bolts have resulted in

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the August Issue

(1) What is the safest and most effective method of unloading new rail from flat cars handled by a work train? Explain the duties of each man involved in this operation. How many cars can be worked conveniently at one time?

(2) To what extent do bridge and building forces do furniture-repair or cabinet work? Where is such work performed? What are the advantages of this practice? Disadvantages? Explain.

(3) What type of switch stand is best adapted to use in yards? Does the kind of yard make any difference? What other factors are involved? Explain.

(4) What is the best method of protecting the tops of creosoted piles from decay after they have been cut off? Are any of the newer brush-on preservatives adaptable to such use? Explain.

(5) What are the advantages of equipping trucks used by the maintenance forces with body dumping attachments? To what extent is it desirable to provide M/W trucks with such attachments? Explain.

(6) What are the advantages and disadvantages of using commercially dried sand for locomotives, compared to sand dried at the point of use? Explain.

(7) How serious is the possibility of spontaneous heating of stored asphalt-saturated mops used in applying built-up roofs? What precautions should be taken to minimize the danger of fire from this cause?

the fishing surfaces of the rail becoming so worn that adequate support cannot be obtained from new or over-size bars.

(2) The rail ends have been bent downward in too short a distance to be properly straightened.

(3) Rail-end batter has progressed until it has caused the rail ends to break or split.

(4) Surface wear and batter has caused the outer edge of the rail head to bend downward.

(5) Corrosion of the rail base or web within the limits of the joint bars may have seriously weakened the rail section.

Rail with any one or a combination of such conditions may require cropping if the general condition of the rail, away from the ends, is satisfactory for re-laying in track. It is also advisable to re-crop rather than weld those rails which have been previously cropped but in which bond-wire holes have inadvertently been allowed to remain and from which end breaks are likely to develop.

Cropping Costs Too Much

By Track Foreman

It is neither safe nor economical to crop rail for main line use. It seems to me that when rail is sawed and drilled for reuse, there is danger of the ball breaking about six to eight inches from the rail ends, or split webs developing near the same location. Such breaks that do occur are generally within the limits of the bond wires and hence do not affect the signal circuits on which we depend for the safe operation of trains.

Another disadvantage to cropping rail is the way it seems to get mixed up during loading, unloading, sawing, reloading and again unloading in the field. All rails do not have the same wear and when such mixed-up rail is relaid, it will not match. The result will be a high percentage of churning joints. These can only be helped by having welders build up the rail ends.

Cropping rails increases the total number of joints per mile and thereby increases the number of spots that require surfacing. When you consider the cost of maintaining these extra joints and the cost of cropping and piece welding that must be done, it would appear that an out-of-face welding job would be cheaper.

Using Obsolete Steam-Locomotive Shops

After complete Dieselization, to what extent can engine-houses, shops, coal docks, and other terminal building facilities be converted to other uses? Explain

Lease Space to Industries

By H. W. Johnson

Chief Engineer, Chicago Great Western, Chicago

At points on our lines where shop facilities are no longer required in our operations we have made every effort to lease these facilities to revenue-producing industries. Shop facilities, usually located at division points where regular switching service is available, should be well suited to industries that receive carload shipments and require large storage areas.

Use in Some Way if Possible

By Division Engineer

When a railroad or division of a railroad becomes completely Dieselized numerous building facilities become obsolete. It costs money to keep such buildings on the property—money for taxes, for insurance, for fire protection, and for any maintenance that is necessary to keep them serviceable. Therefore, unless uses can be found for them in their present location, they should be either moved to points at which they are needed, or they should be retired from service.

However, before either of these alternatives are decided upon, it should be definitely determined that the structures cannot be converted to other uses. In this connection it might be decided that some of the strategically-located buildings can be turned over to the real estate department for lease or possible sale to shippers. Some buildings are ideal for such uses. Perhaps the shops can be converted to work-equipment repair shops, or to garages to house trucks or automobiles. At some points certain classes of buildings might even be converted to permanent labor camps and some types of coal docks could become nucleii for sand and gravel businesses. Perhaps none of these possibilities are applicable to specific cases, but until such impracticability is determined, no buildings should be retired and destroyed.

Complying With Pollution Control Act

In brief, what are the general requirements set up by the Water Pollution Control Act as it affects railways? What instructions should be issued to operating personnel to reduce to the minimum the problems involved in compliance with this act?

Good Housekeeping a Start

By T. A. Tennyson

Chief Chemist, St. Louis Southwestern, Mt. Pleasant, Tex.

Public Law 845, called the Water Pollution Control Act, aims to assist the states through technical and financial aid in controlling pollution of water courses, and paves the way for regional and sectional programs. The Public Health Service and the Federal Works Agency are jointly interested in the administration of the act, although the state agencies will have the first chance to solve their own problems. As a final step in abatement proceedings, the states can bring suit through the Federal courts. Special effort is to be given to the development of treatment methods for those wastes not now susceptible to known treatment, and the enactment of uniform state laws will be encouraged.

Thus, as far as the railroads are concerned, the state regulations will be involved in any waste disposal problems. Present state laws provide for pollution-control agencies, either within existing health departments or by a control board set up specifically for pollution control, and give these agencies authority to set up the code of regulations. While some states do not yet have formal pollution-control laws in effect, there is enough in the common law to de-

fend the inherent rights of the public in stream pollution.

State regulations contain the requirement that a number of materials must be kept out of public waters, and these are: (1) Oil, creosote, and their related products; (2) wood-working waste products; (3) domestic sewage without at least primary treatment; and (4) toxic chemicals, including acids, alkalis and chromium compounds.

Sludge from water - softening plants, and similar materials, cannot be put into certain classes of streams. While such sludges are not considered toxic they can contribute to the formation of turbidity and sludge banks and thereby result in the depletion of aquatic life.

It is obvious that the first step in compliance with regulations is the setting up on railroads of conservation programs and the studying of waste materials to see if they cannot be used to good advantage rather than dumped to become a nuisance. Conserving of materials to eliminate waste often goes a long way toward the solution of a program. Many times the stopping of an oil leak will completely satisfy a complaint and at the same time save the company money.

With good housekeeping as a basic step, there do not appear to be any major problems of railway waste disposal which cannot be solved. The mere issuing of bulletins or instructions to employees is not the answer, because conditions and methods will necessarily be varied. Providing personnel with the know-how, vesting them with the authority, and equipping them with the proper facilities to handle waste-disposal studies does appear to be the proper approach to such problems.

Using Track-Lining Devices

How can track-lining devices be used most effectively in lining curves, turnouts, frogs and other special trackwork? What are their advantages?

Track Liners Save Men

By John L. McMillan
Track Supervisor, Gulf, Mobile & Ohio, Springfield, Ill.

Track shifting requiring more than six men with lining bars should be aided by available lining devices. Curves that are being improved usually require throws that wear out bar gangs, and shifting devices should be used to break the track loose and make the major throws. Bar gangs can do the touching up.

Track in full ballast poses the possible problem of making openings in the cribs for track-lining devices, just as it poses the practically impossible problem of throwing by bar gangs. To lessen the problem for lining devices, make the necessary openings properly, before the shifting is started. It's something one man can do if necessary.

The openings should be made roughly at every half-rail length. Most often pressure is applied at one point at a time. Often the full throw desired cannot be obtained at one time in this way and a curve may be gone over three times, getting all the throw possible each time around. If power is applied at three pressure points each time, it is often possible to obtain all the throw desired in one trip around the curve.

Most shifting or lining devices are set up in pairs and require two at each pressure point. These tools are manned by men facing the direction of throw. They are tilted so that the throw is forward and level. The power of lining devices varies according to the leverage they can exert.

In lining turnouts pressure points should be closer together and must be chosen wisely. Before attempting to shift the turnout, the connecting track should be lined in the direction the turnout is to be shifted. The turnout, to be moved, must not be held fast in the ballast at either end. Hence the track at each end of the turnout should be shifted in the same direction as the turnout. Throwing the ends a little more than required will leave a little slack in the turnout with only the weight of the structure and the ballast friction to overcome. The more pressure points that can be set up in a turnout the better. If you set up at one spot at a time plates or blocks will be needed under the shifting devices. Efficiency in turnout lining requires anticipating the needs even down to the minute detail of having a handle on the plates or blocks.

Frogs are shifted best by setting up pressure points at each end, and, if they are long, a point also in the center. If a crossover frog is to be shifted much, it should be freed from its companion frog or they should both be moved together, requiring the consideration accorded the shifting of a turnout of which a frog is a part.

Rail crossings are laid on ties spaced and arranged in such ways that lining devices can not be set up under them. They are shifted by rail pullers and expanders or by the more costly method of driving them to line with a length of rail swung by a tong gang.

Reduce Effort With Liners

By Track Supervisor

Giving track the detail line that is required for present high speeds is almost an art that differs very little whether you use liners, small jacks or mere lining bars. Methods vary much less than the effort required.

Stringline methods of maintaining uniform curvature have been in use for so long now that the "big throws" of yesteryear are almost forgotten. After stakes or tacks have been set and the direction—and preferably the amount of throw—has been marked with kiel on a tie at each station, one or two men are sent ahead of the lining gang to dig holes for the liners or jacks. At first these can only be dug at stations, but may later be found necessary at particularly bad links in joints or quarters.

One of the major "tricks" of the track liner's trade, when lining stone-ballasted track, is to set the majority, if not all, of his liners or jacks against the rail in the direction of throw, e.g., at the high rail of a curve that is to be thrown out, or at the low rail of a curve that is to be thrown in. The reason for this is that sometimes it is necessary at such points to raise the ties slightly to get them above the ballast stones that have become em-

bedded in their bottoms. If the track is raised under both rails, there can be little forward motion. Also, small particles of ballast will roll under the ties and leave them in an out-of-surface and insecure position. Where throws are "heavy" it might also be well to dig out at the ends of ties to preclude the ties from "climbing" on the shoulder ballast.

Another well known "trick" is not to wear men out straining to complete a "large" throw, but rather to move ahead often to equalize the strain as well as to maintain a "run off" that will not be abrupt but rather will be at least as smooth riding as the track was before the lining work began. In doing this, it is very helpful for the foreman to place small pieces of dirt or stone on top of the rail at the stations that have been thrown to correct alinement. Such particles help the foreman to line between the stations by eye. Care should be used to assure the removal of these stones prior to the passage of a train.

Turnouts can only be lined correctly by suiting one's methods to the conditions at hand. Unless throws are heavy, the same general methods are applicable in lining turnouts as other track, except of course that more liners and more power is required to move the greater weight, the longer ties, and the more rigid construction. Under such conditions it is usual to move the liners closer together and thus concentrate the effort.

Warning Trains of Flash Floods

How practicable are devices applied to railway bridges and trestles to warn of high water or other hazards to the safe passage of trains? Under what conditions should they be used? How do such devices operate?

Warning Devices Effective

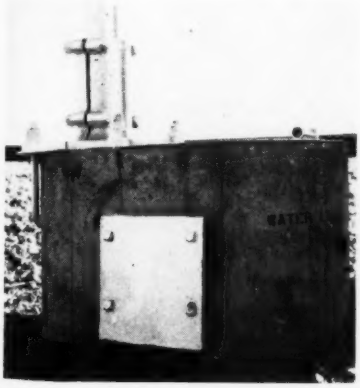
By R. R. Wood
Signal Engineer, Missouri-Kansas-Texas, Denison, Tex.

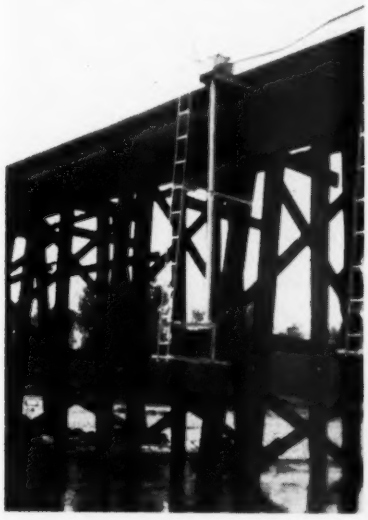
About 20 years ago we installed circuit controllers attached to a float mechanism which would set our automatic signals at stop in the event that water reached the toe of the ballast at certain low places along the track within automatic signal territory. So far, we have been very successful in being able to detect flood conditions at these locations.

Recently we have felt the necessity for similar protection on our Northwestern division where flash floods are likely to cause damage to our trestles. To prevent such damage we have installed a set of flood indicators on two of the more important trestles so that, in the event water rises to a predetermined height, signals which have been placed at braking distance from either end of the bridge will be set at stop. These signals are of standard color-light type with approximately ½-mile approach circuits. Arranged in that manner these signals not only serve as automatic flood indicators but as automatic block signals covering the territory over the trestles.

It is our belief that, where flash floods may occur without previous warning, protection of this character is necessary, and to secure this protection we have, as stated above, made numerous installations within automatic signal territory in addition to the two isolated installations on our Northwestern division. Some of these detectors are located where flood damage had occurred previously. Others were placed at locations selected by calculations based on the area of the water shed, the direction of the stream near the right of way, the size of bridge opening and other local factors. The detectors are located on the railroad right-of-way at a level at which flood water might cause damage to the embankment, ballast, track, bridges, trestles or other structures.

Each detector includes an airtight float made of sheet copper. This float operates in a hollow concrete chamber which serves also as a foundation for the post on which the controller case is mounted. Holes through the foundation wall, near the ground line, permit the ready entrance of water. The float is on a lever, so arranged that, when water rises, the lever raises an up-and-down rod extending up through the pipe post to operate the controller in the case. Having once operated to open the controller contacts, the controller remains open until restored by the signal maintainer.





Above—This device is used on M-K-T at certain low places along the track to set the automatic signals at stop if water reaches the toe of the ballast.

Right—Flood indicators on a trestle on the Northwestern division of the M-K-T

Detectors Warn of Washouts

By A. B. Chaney
Assistant Chief Engineer-Maintenance, Missouri Pacific, St. Louis, Mo.

We have made satisfactory use of high-water detectors for the past 12 years. The device used consists essentially of a float and a housing, containing terminals and a mercury-tube contactor, mounted on a steel post and so located when flood water reaches a predetermined height, signals are set

in stop position. These detectors are usually located on the shoulder of the roadbed, a short distance from stream crossings, where there is less likelihood of damage by turbulence and drift. They are used in signal territory where flash floods are expected.

These detectors can be attached to piers or bents of bridges, but it has been considered advisable to locate them as described above. The average installation in signal territory costs about $300. They have functioned on several occasions during flash floods to stop traffic where washouts or threatened washouts occurred. Signals set in stop position by these devices cannot be cleared until a signalman closes the circuit by resetting the mercury-tube contactor.

Draining Tracks Through Stations

What is the most effective method of providing adequate drainage of multiple tracks through low-level station platforms? Explain.

Cover Ballast With Asphalt

By J. F. McCook
Division Engineer, New York Central, Chicago

We have found that an effective method of draining tracks through low-level station platforms is to cover the ballast in the tracks and center ditch with "black top" and thereby drain water rapidly into catch basins.

If the work is being done as a maintenance item, and not as a new project, it will be necessary to remove all foul ballast from the cribs and intertrack space, and from under the ties as much as local conditions will permit.

Of first importance is a sound drainage system of catch basins in the intertrack space. These should be spaced not more than 100 ft. apart, should have grating covers, and should be built so that the tops of the covers are about three inches below the bottoms of the adjacent ties. At the catch basin locations clean ballast is then placed in the intertrack space up to within 1½ in. of the tops of the catch-basin covers.

In the intertrack space, at the mid-points between catch basins, clean ballast is placed up to within four inches below the tops of the adjacent ties. This will, therefore, provide a pitch of six inches in 50 ft. between the mid-points and the catch basins. Between the rails, and uniformly at every tie, the clean ballast is placed to within 1½ in. below the tops of ties at the platform end, 2½ in. at the center of tie, and 3½ in. at the intertrack end of the tie.

After the ties have been thoroughly tamped, a seal coat of 1½ in. of asphaltic black top is placed over the ballast, both in the cribs and in the intertrack space. This provides a roof over the ballast, affords a quick run-off for rain water and prevents both water and dirt from getting down into the ballast.

The black-top surface is tamped to compactness at all points, and molded around the ends of ties and in the intertrack space to form a smooth rounded gutter. With such provision for the quick disposal of water and dirt, this track should need no maintenance for several years, and then only minor repairs to the black-top surface.

Provide Good Storm Sewers

By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Adequate drainage of multiple tracks through low-level station platforms calls for catching the water as soon as possible and carrying it away without overcharging conduits and sewers. This makes proper-size conduits necessary between all tracks and on the outside of outside tracks. The designer should be familiar with good storm-water sewer design and practice.

After the water has been collected, it has to be disposed of. Gravity will cause it to run off if proper grades are provided. Where adequate grades cannot be obtained, sumps and sump pumps are necessary to boost the outflow. If sewer outlets are below high tide, sea gates must be installed, and sumps should be designed large enough to hold the run-off during high tides. In some locations, tide gates may be necessary at the sump outlets.

Treated-Wood Box Drain Used

By Track Supervisor

Drainage of tracks through station platforms is such a common problem that practically every method imaginable has been employd at some time or other. One such method that was designed to improve a particularly troublesome station area may be of interest.

Visualize a three-track main-line railroad passing through the lowest, flattest section of a town on a roadbed originally constructed across a swamp, and crossing a double-track trunk line at a passenger station serving both roads. On one side of the station, a low-level platform serving the near track of the three-track road extends 12 car lengths beyond the crossing frogs. A low-level island platform, about eight cars long, is located between the other two tracks. A pedestrian subway connects the two platforms.

Draining the two tracks between these platforms is not only complicated by the railroad crossing at one end, the pedestrian subway in the middle, and a grade crossing at the other end, but by the swampy subgrade that in wet weather becomes an ooze that will flow into and soon block any subdrainage system installed.

In an effort to improve this situation, a treated-timber box drain was installed to receive the surface water and drain the sub-surface ooze. These boxes were installed at a minimum depth of about 18 in. and a maximum of about 3 ft. below the bottoms of the ties.

To install the boxes, the entire intertrack space was excavated to a depth that would permit the best gradient possible. The boxes were constructed slightly narrower than the excavation to allow back filling with clean ballast.

The entire box drain was constructed in 8 to 12-ft. sections which were lowered into the trench and fastened together. In constructing the sides of each section, treated 2-in. by 6-in. boards were used horizontally, with a space left between adjacent boards large enough for drainage but not

(Continued on page 570)

The 1950 Census of your *Branch Line* Supervisors

... will show a *decided* preference for the Woodings Anchor because of its extremely high reapplication value.

"THE WORLD'S MOST POWERFUL RAIL ANCHOR"

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large enough to allow ballast to enter the box. The floor was laid tight, and all cross pieces to which individual boards were nailed were kept beneath the box. This facilitated shovel cleaning. Of course, the sides of the box had to be held apart and steadied by cross members spaced at intervals of 8 or 10 ft. intervals. These cross struts also supported the removable, slotted top which was made in sections to facilitate removable. When installed, the tops of the boxes were kept below the bottoms of the ties and covered with ballast. To aid in draining the track, all cribs were cleaned, new ballast applied and the tracks were surfaced.

Constructed in this manner, and in spite of physical limitations which prevented the use of the most desirable gradient on one portion of the drain, these boxes functioned well. Within a short period of time several inches of ooze had seeped into the boxes and had to be removed. Periodic cleaning of the boxes, simplified by the removable tops, assured the effectiveness of the drains.

Using Built-Up Aluminum Roofing

To what extent is built-up aluminum roofing adaptable to use on railway buildings? How should it be laid to produce the most effective results? Explain.

Promises Advantages

By K. E. HORNUNG
Architect, Chicago, Milwaukee, St. Paul & Pacific, Chicago

To date our experience with aluminum roofing has been limited to utilizing it as a patching material for broken and worn spots before recoating built-up asphalt roofs, where ordinarily we would use an asphalt saturated cotton membrane or asphalt saturated felts. We have found it almost as economical in cost and as easy to lay, and we are in hopes it will prove more durable and have less tendency to shrink and curl as the roofing asphalt dries out over a period of time.

We are not yet ready to say a complete cap sheet of this material will provide a more durable roof with less periodic maintenance than the all-felt roof. It appears, however, that its high tensile strength, its lack of shrinkage and its moisture-proof qualities, as well as its ability to reflect the harmful rays of sunlight from the asphalts underneath, should be a definite asset. Its ability to reflect the sun's heat, as opposed to the property of ordinary built-up roof to absorb it, will provide cooler working conditions during summer months. There is, I am sure, also an added insulating value during winter months.

Unless it is found that the sulphurous acid conditions prevalent around railroad structures has a destructive effect, this material, when applied as a cap sheet on smooth surfaced roofs, will, in all likelihood, provide longer life at less cost in maintenance than other roofings.

TRUCK CRANE WITH RAILROAD APPLICATIONS—Shown here is a Bucyrus-Erie Hydrocrane in service on the Long Island. This machine, operated entirely by hydraulic power, has a telescoping boom which permits moving a load horizontally without moving the crane or changing the boom angle. A solid working base for the crane is provided by hydraulic outriggers, which may be set quickly in position by controls located on the operating deck.

Aluminum Is Adaptable

By ENGINEER OF BUILDINGS

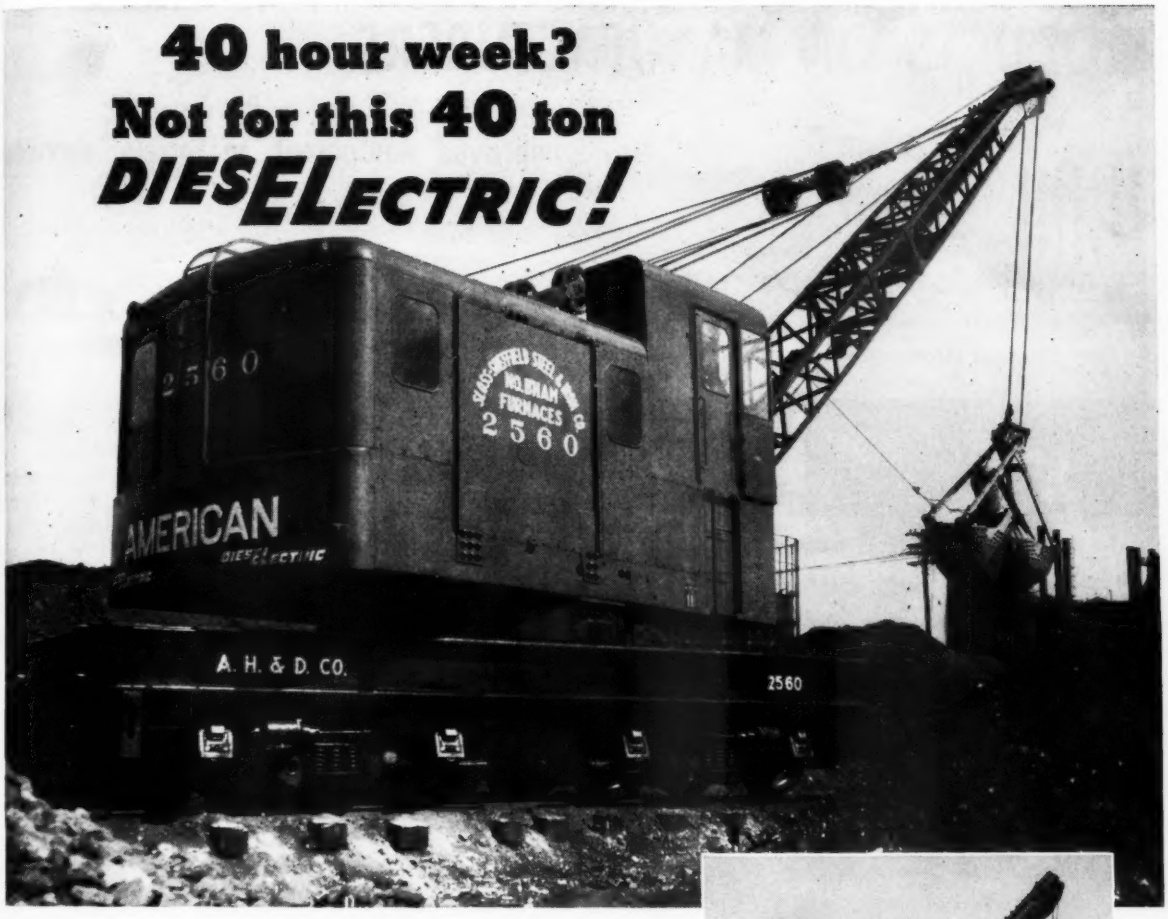
I see no reason why built-up aluminum roofing is not as adaptable to railway use as to any other. It is as easy if not easier to apply, is said to be as durable and to require less maintenance, and is more fire resistant than many other roofing materials.

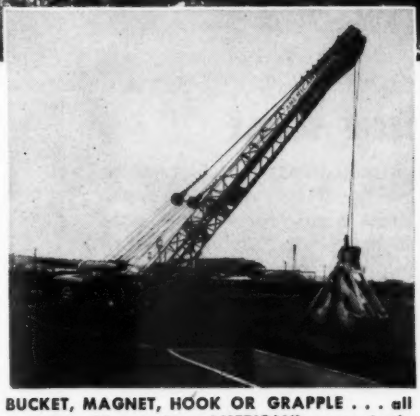
Aluminum roofing is now being furnished factory laminated to 15-lb. asphalt-saturated roofing felt so that a built-up roof surface consisting of two layers of felt covered by a layer of aluminum can be applied in a single step. This roofing consists essentially of a sheet of asphalt roofing felt, to one half of which an aluminum sheet is laminated.

The roofing is laid in a conventional manner by lapping the aluminum side of each sheet ½ in. over the aluminum of the previously laid sheet. Succeeding courses, lapped in this way, provide a double layer of asphalt protected from the elements by the sheets of aluminum.

The aluminum covering, by preventing the asphalt felt from drying out, cracking peeling, blistering or alligatoring, reduces the expense of future maintenance.

40 hour week? Not for this 40 ton DIESELECTRIC!





BUCKET, MAGNET, HOOK OR GRAPPLE . . . all operated with ease from AMERICAN's conveniently banked control panel. The DiesELectric Locomotive Crane is manufactured under Patent No. 2083460. Touch Control Patent No. 2370856.

Here's a crane that will work non-stop for 168 hours a week if you want—week after week after week. No coal stops, no boiler cleanouts, no water stops, no long and costly shutdowns for overhaul. It's the 40 ton AMERICAN DiesELectric!

These smooth working DiesELectrics are doing a wide variety of jobs, handling coal, scrap and other materials. They pay for themselves by tremendous work output and a remarkable reduction of upkeep expense.

Maintenance savings of up to 50% are the result of patented DiesELectric design, using electric traction power to the trucks, diesel power to the crane deck. This design eliminates seven tons of wearing parts from the underbody, cutting down-time, labor and shop repair to a point where these savings will equal the entire cost of the crane in five years. Want to find out what a new AMERICAN DiesELectric could do for you? Mail the coupon below, for literature.

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PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 519)

The American Optical headrest goggle is easily adjustable to any head size

HEADREST GOGGLE

THE American Optical Company, Southbridge, Mass., has announced a headrest goggle for welders, cutters, burners, etc., which, incorporating the "free-floating" headgear long used on this company's welding helmets, may be easily adjusted to the wearer's head size by a slight twist of a knob. The mechanism is enclosed in a fiber tube for insulation and to prevent hair pulling. The "free-floating" head gear is said to provide good balance with no overhanging weight, and the goggle may be instantly changed to the "off-guard" position by a flick of the wrist.

Designed to be worn either directly over the eyes or over prescription glasses, the goggle has well - ventilated, indirect side shields to keep out sparks, metal splashes or stray light rays. The goggle is available with several shades of either Noviweld or Noviweld-Didymium lenses, and is provided with replaceable cover lenses to protect these filter lenses.

LOCOMOTIVE CRANE WITH HYDRAULIC DRIVE

THE Browning Crane & Shovel Co., Cleveland, Ohio, has announced a locomotive crane featuring a torque converter drive which is similar in operation to the automatic transmissions used in automobiles. Known as the Browning Torqflo, the new crane is available in three models, ranging in capacity from 25 tons to 50 tons.

The Browning Torqflo drive is a specially-designed hydraulic unit which is reported to provide smooth and fast transmission of power to the travel, swing, hoist and boom-hoist mechanisms. The converter, it is said, always supplies the correct amount of power required for each operation and hydraulically absorbs sudden increases in loads, with the result that wear of the clutches and brakes is held to the minimum. Automatic adjustments of the converter eliminate shocks to the cables, clutches and gear train.

The Browning Torqflo crane with hydraulic power transmission

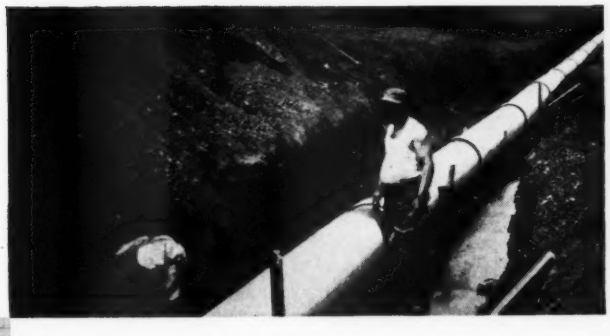
TEST DIFFERENTIATES HEART FROM SAPWOOD

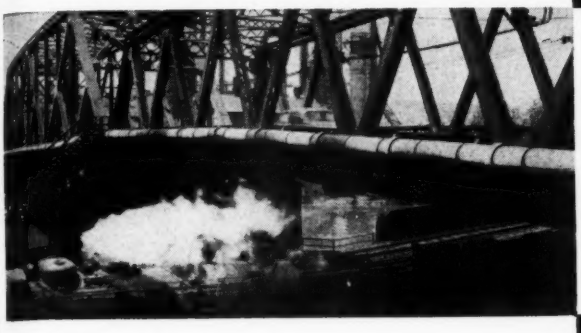
THE desirable ultimate in the pressure treatment of Douglas fir poles or piles is 100-per cent impregnation of the sapwood. But frequently the extent of impregnation of this part of the wood cannot be accurately determined because of the difficulties of determining where the sapwood leaves off and the heartwood begins.

However, A. W. Imhoff, chemist of the technical department of the Wood Preserving division, Koppers Company, Inc., Pittsburgh, Pa., has devised a simple test which is reported to differentiate between heartwood and sapwood in increment borings taken from the timber. The test involves the use of a solution consisting of 5 milliliters of concentrated hydrochloric acid and 10

(Continued on page 574)

Resists corrosion...





Withstands vibration...

Saves on installation...

...3 good reasons why TRANSITE PIPE cuts railroad water-line costs to the bone!

HERE'S WHY many of the country's leading railroads have invested in Transite* Pressure Pipe as the key to *long term* water-line economy:

Resists corrosive soils—Transite Pipe is made of asbestos and cement, steam-cured under pressure to give it exceptional corrosion-resistance. That's why this pipe stays strong, even when exposed to such highly corrosive soils as cinder fills, salt marshes and other acid or alkaline soil conditions.

Withstands traffic shocks, earth movements—Transite's Simplex Couplings make up tight, stay tight in service. And because these joints are flexible, they absorb the shock and vibration of train traffic, help compensate for soil movements and other stresses—providing a constant safeguard against leakage of water into adjacent soil and protecting against costly pipe failures.

Saves on installation, gives long service—Pipe-laying crews can lay more pipe per day with Transite because it is light in weight, easy to handle, and because the simple coupling method used speeds up assembly, saves time on the job. And these initial installation economies are followed by long-term economies in both operation and maintenance that help assure lower water-line costs over the years.

For further information about Transite Pipe, write for Brochure TR-11A. Just address Johns-Manville, Box 290, New York 16, N. Y.

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JOHNS-MANVILLE JM PRODUCTS **Johns-Manville** 92 YEARS OF SERVICE TO TRANSPORTATION

For additional information on any of the products described on this page, use postcards, page 519.

milliliters of melted phenol, C. P., dissolved in 95 per cent ethanol to a total volume of 60 milliliters. Slight agitation of the chemicals will cause a complete solution.

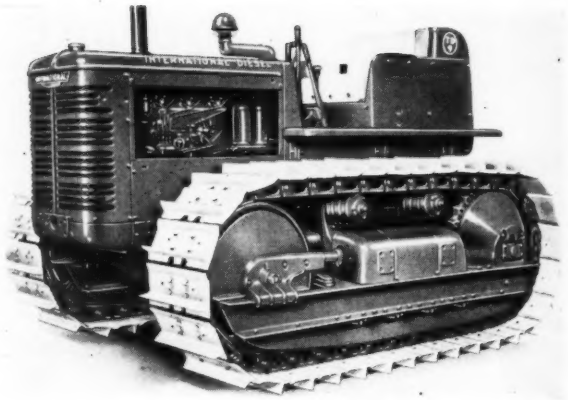
The solution is applied by a medicine dropper to a radial face of a split increment boring, which is then exposed to direct, bright sunlight. After about two minutes of exposure the sapwood turns green and the heartwood becomes a reddish purple. Ultra-violet light may be used instead of sunlight, in which case the reaction takes about four minutes. The stained specimen should be inspected under ordinary light, however, rather than under the ultra-violet rays. Borings thus treated are reported to retain their color distinction for some time if stored in a dark place.

DIESEL PILE HAMMER

AN ENTIRELY self-contained pile hammer which operates on Diesel oil from a fuel tank mounted on the hammer, has been built by the Syntron Company, Homer City, Pa., for the U. S. Navy. Called the Syntron Diesel pile hammer, it is made up of a cylinder, piston or ram, fuel tank, fuel pump and injectors, mechanical lubricator, and lubricant tank. It fits in standard 20½-in. leads and requires one line for lifting the hammer and another for both lifting the pile and starting the hammer by lifting the piston. The force of each blow is controlled remotely by the operator on the ground by a hydraulic fuel-pump control system, and it is said that the power per blow can be regulated from zero up to 16,000 ft.-lb.

Official U. S. Navy photograph

The striking piston of the Syntron Diesel pile hammer weighs 5,400 lb., has a 48-in. stroke, and develops a maximum blow of 16,000 ft.-lb.



As a result of design changes in the engine, the power ratings of the International TD-9 Diesel crawler tractor have been increased

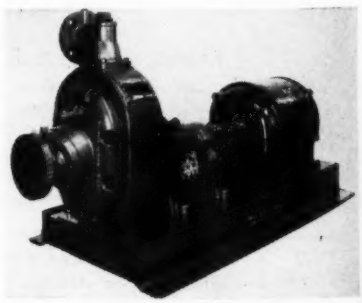
MORE POWER FOR INTERNATIONAL TD-9

HIGHER power ratings for the International TD-9 Diesel crawler tractor, resulting from design changes in the four-cylinder engine, have been announced by the International Harvester Company, Chicago. The latest TD-9 has a drawbar horsepower of 40.5, compared to 38.88 in the previous model. The flywheel horsepower is 51.5, an increase of two horsepower. Belt horsepower, formerly 45.91, has been raised to 48.5. The maximum drawbar pull in first gear, with the engine operating at maximum torque, is 11,400 lb., which represents an increase of 1,150 lb. Travel speeds—five forward to a high of 5.3 m.p.h. and one in reverse, 1.7 m.p.h.—are unchanged.

Greater engine power has been obtained through a redesigned combustion system, featuring new pistons, an improved precombustion chamber, simplified injection nozzles, a new fuel pump, and a higher compression ratio, 15.7:1, as compared to 14.4:1. In addition, the engine now has a counterbalanced crankshaft and new connecting rods for smoother operation and longer life of parts.

PUMP IMPROVEMENTS

MARLOW Pumps, Ridgewood, N. J., recently announced several important improvements to its line of self-priming centrifugal pumps as used by the railroads in Diesel refueling and water service. Among these improvements are changes in the design of the front cover, and of the check valve, and the introduction of a new leak-proof shaft seal. The front cover has been considerably strengthened and the check valve has been redesigned to provide greater resistance against leakage. The shaft seal, designed to prevent leakage between the rotating pump shaft and the stationary pump casing, is available in two types; the self-lubricating seal, for clear liquids and petroleum products, and the grease-lubricated seal, for fluids containing abrasive solids. Flanged fittings are now available with these pumps in the 2-in. and 3-in. sizes. Also, the suction inlet has been lowered to obtain a smoother fluid flow.



The improved Marlow motor-driven self-priming centrifugal pump

"I Ordered a Tank Car of 'HERBICIDOL' in 1949" . . .

"UNKNOWN TO YOU I ALSO ORDERED A TANK CAR OF CHEMICAL FROM TWO OTHER COMPANIES ACTIVE IN THE WEED KILLING SUPPLY FIELD. I KNEW ALL ABOUT YOUR PRODUCT BUT THE RAILROAD THAT I MOVED OVER TO LAST YEAR KNEW NOTHING OF WEED KILLERS. SO I HAD TO SELL MY NEW BOSS. THE RESULTS OBSERVED IN THE USE OF "HERBICIDOL" WERE SO CONSPICUOUSLY SUPERIOR TO THE OTHER PRODUCTS THAT I NOW HAVE APPROVAL TO GIVE YOU OUR ENTIRE ORDER FOR 1950. "

This was just one more case where we were able to recommend a weed killing chemical with the killing power that a poisonous base product contributes wthout involving the railroad in livestock claims.

The killing power in this test clearly was superior to that of the non-poisonous products used in comparison.

But, we also have an oil base "HERBICIDOL" which is NON-POISONOUS for use where management will not tolerate the use of a poisonous base product.

Our policy is to recommend the type of weed killing chemical best suited for your particular conditions.

The talent and experience of our organization is at your disposal to study and make recommendations for your weed or brush control program.

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PLANTS IN NUMEROUS RAILROAD CENTERS

THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers

Maintenance-of-Way Brotherhood Asks Rehiring; Job Guarantees

Stabilization of employment levels and a restoration of "normal" maintenance-of-way forces are the two principal demands served May 15 on over 300 railroad and terminal companies throughout the country by the Brotherhood of Maintenance of Way Employees. The demands are being served on the individual carriers by 300 of the brotherhood's general chairmen.

The Union's proposal is that all maintenance of way employees who are on the payroll of a carrier as of January 15 of any year beginning with 1950, shall be given full employment for that year. Those on the payroll March 15 shall be given full employment for eight months and those on the April 15 payroll, 6 months.

The other major demand by the union is that the carriers restore to service all employees taken out of service on September 1, 1949 and thereafter, with the advent of the 40-hour week for M/W workers. T. C. Carroll, president of the brotherhood has stated to the press that the reduction of M/W employment has resulted in the abolition or lengthening of sections "beyond the maximum that can be safely and efficiently maintained." Under the procedure of the Railway Labor Act these demands will probably not reach the "crisis" stage for several months, some sources estimating that it will take as high as eight months before a strike can legally be called.

Changes in Railway Personnel

General

Ray E. Butler, vice-president and chief engineer of the Newburgh & South Shore at Cleveland, Ohio, has been appointed chief operating officer, with the title of vice-president and superintendent.

Charles B. Neihaus, land and tax agent on the Central of Georgia, at Savannah, Ga., retired on May 15. Mr. Neihaus began his railway career in 1906 and has served on the Kansas City Southern, the Illinois Central and the C. of Ga. Until 1920, most of his assignments were in the engineering departments.

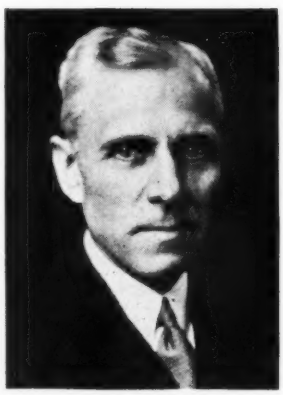
Engineering

William C. Humphreys, assistant engineer of buildings on the Chicago, Rock Island & Pacific, has been appointed engineer—architect, with headquarters as before at Chicago. Mr. Humphreys succeeds **Eli Christianson,** who has retired.

R. D. Claborn, auditor of capital expenditures on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, has been transferred to the engineering department at that point as assistant engineer.

H. B. Barry, chief engineer of the St. Louis-San Francisco, with headquarters at Springfield, Mo., retired on June 1, after 48 years of service with the Frisco and its predecessors. He is succeeded by **E. L. Anderson,** assistant chief engineer at Springfield. **B. H. Crosland,** also assistant chief engineer at Springfield, has been appointed assistant chief engineer, Eastern district, at that point, and **F. E. Short** has been appointed assistant chief engineer, Western district, there.

Mr. Barry was born at Hillsboro, Ill., on May 19, 1880, and received his higher education at the university of Illinois. He began his railroad career in July, 1902, as an instrumentmen on construction for the Missouri, St. Louis, Memphis & Southeastern (now part of the Frisco, and later served in various capacities with several other roads. In August 1906, he was made an instrumentman in the district engineer's office of the Frisco at Monett, Mo., and the following November became assistant engineer at Memphis, Tenn. He was appointed district engineer at Chaffee, Mo., in 1911, and was advanced to principal assistant engineer in the chief engineer's office at St. Louis, Mo., in 1920. Mr. Barry was promoted to assistant chief engineer at St. Louis in 1929, and four years later he was transferred to Springfield. He became chief engineer in January, 1946.



H. B. Barry

C. E. Wood, trainmaster on the Missouri Pacific, at Little Rock, Ark., has been appointed acting division engineer on the Little Rock-Louisiana divisions, with headquarters at Monroe, La. He succeeds **W. Rambo,** granted sick leave.

S. J. Owens, Jr., assistant engineer on the Chicago, Burlington & Quincy, at Boysen, Wyo., has been appointed division engineer, with headquarters at Casper, Wyo., succeeding **E. L. Haley,** whose death is reported elsewhere in these pages.

Raymond G. Wintrich, assistant engineer maintenance of way of the Newburgh & South Shore at Cleveland, Ohio, has been appointed chief engineer, succeeding **Ray E. Butler,** whose promotion to chief operating officer is noted elsewhere in these columns.

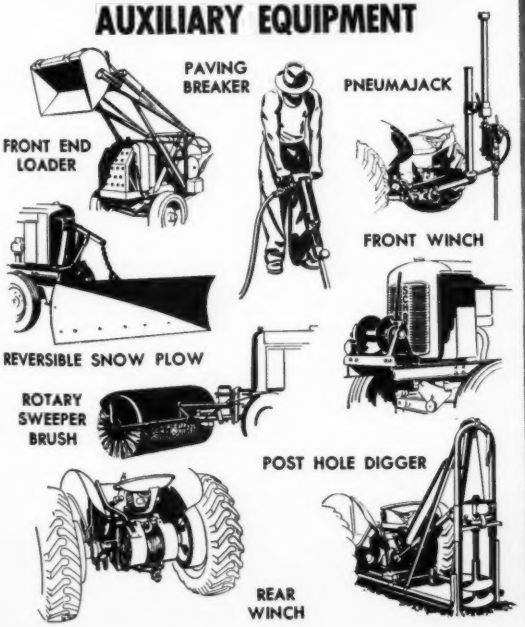
E. B. Harris has been appointed chief engineer of the Jacksonville Terminal at Jacksonville, Fla., in charge of valuation, roadway, bridge and building and signal departments, succeeding **R. C. Caldwell,** who has resigned.

J. E. Spangler, assistant to division engineer on the Seaboard Air Line, has been promoted to assistant division engineer on the Georgia division, with headquarters at Atlanta, Ga. **J. W. Thomas,** assistant to divison engineer at Atlanta, has been promoted to assistant division engineer of the Alabama division, with headquarters at Americus, Ga.

(Please turn to page 578)

The Pneumatractor

SCHRAMM *PNEUMATRACTOR* AUXILIARY EQUIPMENT



. . . *Presenting the Latest—Most Modern*

SELF-PROPELLED AIR COMPRESSOR

SCHRAMM'S newest unit: the *Pneumatractor*; an air compressor that is also a tractor.

Extremely versatile, it is NOT a power takeoff or power unit mounted on a tractor, but is powered with Standard Model 60' *Unistage* or the 105' *Pneumapower* Schramm Compressor. Available with a completely engineered and approved set of accessories, a few of which are illustrated at the left.

FOR FULL DETAILS, WRITE TODAY FOR BULLETIN NEU-50.

SCHRAMM INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

Railway Personnel (Cont'd)

W. E. Griffiths, engineer of track of the Canadian National at Montreal, Que., has been appointed assistant chief engineer of the Central region at Toronto, Ont., succeeding **A. V. Johnston** transferred. **Gordon L. Plow,** senior assistant engineer, was promoted to engineer of track to succeed Mr. Griffiths, with headquarters as before at Montreal. **C. F. Stuart,** assistant engineer on the Atlantic region, has been transferred in the same capacity to system headquarters at Montreal.

John S. Parsons, division engineer of the Kent division of the Erie, at Marion, Ohio, has been promoted to assistant chief engineer—maintenance of way, with headquarters at Cleveland, Ohio. **R. J. Pierce,** division engineer of the Wyoming and Jefferson divisions, Dunmore, Pa., succeeds Mr. Parsons at Marion. The position formerly held by Mr. Pierce has been abolished and maintenance of way activities on the Wyoming and Jefferson divisions have been transferred to the jurisdiction of **R. H. Boykin,** superintendent at Dunmore.

W. S. Ray, whose promotion to engineer of bridges of the Central of Georgia, with headquarters as before at Savannah, Ga., was announced in the May issue, was born at Blackville, S. C., on December 28, 1903, and attended Clemson college, graduating in civil engineering in

W. S. Ray

1924. He entered the service of the C. of Ga. on January 12, 1925, as a bridge and building inspector and was promoted to assistant engineer in 1928. He was made architect on January 1, 1941, and advanced to assistant engineer of bridges and buildings in the fall of 1948, serving in the latter capacity until his recent promotion.

H. G. Whittet, Jr., designer on the Chesapeake & Ohio, has been appointed assistant engineer, with headquarters at Richmond, Va.

C. M. Carnahan, transitman on the Baltimore & Ohio, has been appointed field engineer, with headquarters at Cincinnati, Ohio.

Francis Martin, assistant division engineer on the Delaware, Lackawanna & Western, has been promoted to division engineer, with headquarters at Buffalo, N. Y.

E. B. Crane, assistant chief engineer, Lines West, of the Chicago, Milwaukee, St. Paul & Pacific, at Seattle, Wash., has retired. Mr. Crane was born at Dexter, Iowa, on March 15, 1882, and received his higher education at the University of Iowa. He started his railroad career in 1904 as a draftsman with the Chicago, Burlington & Quincy at Chicago, and later held similar posts with the Inter-Urban (now Des Moines & Central Iowa) and Des Moines City (a transit property) at Des Moines, Iowa. In 1905 he joined the Milwaukee as an instrumentman at the Seattle terminals, subsequently holding the positions successively of resident engineer at Sumner, Wash., terminal engineer at Tacoma, Wash., assistant engineer, construction and maintenance, on the Coast division, and assistant engineer maintenance of way, Lines West, at Avery, Idaho. In 1915 he became pilot engineer in the valuation department, and the following year was made assistant engineer, valuation department, at Chicago, being appointed assistant valuation engineer at that point in 1918. From 1920 to 1922 Mr. Crane served as engineer auditor at Chicago. He was later transferred to Seattle as principal assistant engineer, and in 1947 was promoted to assistant chief engineer, Lines West, there.

BALLAST IS SCREENED BY CONTRACT — ELIMINATING INVESTMENT BY RAILROADS IN THIS ONE OPERATION EQUIPMENT . . .

Stone ballast cleaned by the Speno method is thoroughly cleaned because it is screened twice. In order to obtain a thorough cleaning, two passes are necessary to restore the ballast to as clean a condition as when it was originally placed in the track. The two passes are accomplished in less time than a single pass by other mechanical methods.

Preferably, the ballast is cleaned ahead of a general track raise, and under the Speno method, no cribbing is necessary. Because of the drainage that the Speno method attains, the cleaning lasts from one general raise until it is time for another general raise, normally over a period of from three to six years, depending on conditions.

Speno equipment, working under traffic without interference with railroad operation, (the track adjacent to the one being worked is not fouled by our equipment in working position) easily keeps ahead of track raising programs.

The high production and low cost of this service are worthy of consideration.

FRANK SPENO RAILROAD BALLAST CLEANING CO. INC.

306 North Cayuga Street Ithaca, New York

Track

W. Patrick, roadmaster on the Canadian National at Edson, Alta., recently retired after 27 years' service.

N. Ashley, Jr., has been appointed assistant supervisor of track on the Grand Trunk Western at Durand, Mich.

Charles Baulkwell, assistant supervisor of track on the Boston & Albany at Springfield, Mass., has been promoted to supervisor of track at Worcester, Mass. He succeeds **G. P. McKenna,** who retired on April 30.

M. Olson, relieving roadmaster on the Portage division of the Canadian Pacific at Sidney, Man., has been promoted to roadmaster at Brandon, Man., to succeed **L. R. Weave.** Mr. Weave, in turn, becomes roadmaster at Ignace, Ont., replacing **A. Holmstrom,** who succeeds **T. D. Ruggles,** roadmaster at Kenora, Ont., who retired recently after 39 years' service.

W. L. Kelly, general roadmaster and safety supervisor on the Eastern district of the Erie at Jersey City, N. J., has been appointed track supervisor at Paterson, N. J., replacing **L. H. Judd,** who has been transferred to North Newark, N. J., to succeed **M. E. Condon,** who becomes general foreman at Jersey City. **J. L. Leonard,** Western district general roadmaster and safety supervisor at Youngstown, Ohio, has been appointed track supervisor at Susquehanna, Pa., succeeding **P. W. Scribner** who has been moved to Dunmore, Pa., replacing **C. S. Bray,** who has been appointed general foreman at Hornell, N. Y. The position of general roadmaster and safety supervisor has been abolished.

Bridge and Building

W. Guthrie, bridge and building master on the Canadian Pacific at Saskatoon, Sask., retired recently after 34 years' service.

Ingvald Jorgensen, bridge inspector on the Terminal division of the Erie, has been promoted to assistant master carpenter of that division, with headquarters as before at Jersey City, N. J.

R. W. Cassidy, assistant supervisor of bridges and buildings on the Chesapeake & Ohio at Richmond, Va., has been promoted to supervisor of bridges and buildings on the Chicago divison, with headquarters at Peru, Ind. He succeeds **G. F. Gilbert,** who retired on May 1.

(Please turn to page 580)

Front Cover Photo

The photograph reproduced on the front cover of this issue, showing the line of the Western Pacific Railroad Company in the Feather River canyon, is presented through the courtesy of that road.

He knows something about wood preservatives

He has to work on poles after they're treated, and he has some firm convictions about the preservatives used. It won't hurt your labor relations to consider his views.

He knows that a preservative has to *preserve*, and that the first consideration is lasting, certain effectiveness. He knows the company has to watch its costs, that it isn't good business to pay more than you have to for effective wood protection. But—and this is his big point—he holds that if there's a choice of preservatives at the same price, and with demonstrated effectiveness, the company ought to choose the one that's best from the *worker's* point of view.

Penta Preservative is clean—not sticky or dirty. Treated wood is virtually odorless, non-irritating to the skin. **Penta** Preservative is the most certain protection you can buy, but it costs no more, for material or treatment, than other preservatives commonly used.

Why not give your workmen a break? If you want facts as to the effectiveness and certainty of **Penta** Preservative, we'll be glad to supply overwhelming evidence. Write for full information.

CHAPMAN CHEMICAL COMPANY
772 DERMON BUILDING • MEMPHIS 3, TENNESSEE

TRADE CHAPMAN MARK

• IT'S CERTAIN • IT'S CLEAN •
IT'S CLEAN **PENTA** IT'S CERTAIN
PRESERVATIVE
• IT'S CERTAIN • IT'S CLEAN •

Railway Personnel (Cont'd)

Special

W. C. Barnes, engineer of tests, Rail Investigations committee, Association of American Railroads, has been appointed consulting engineer, Detector Car Service, A.A.R., with headquarters as before at Chicago.

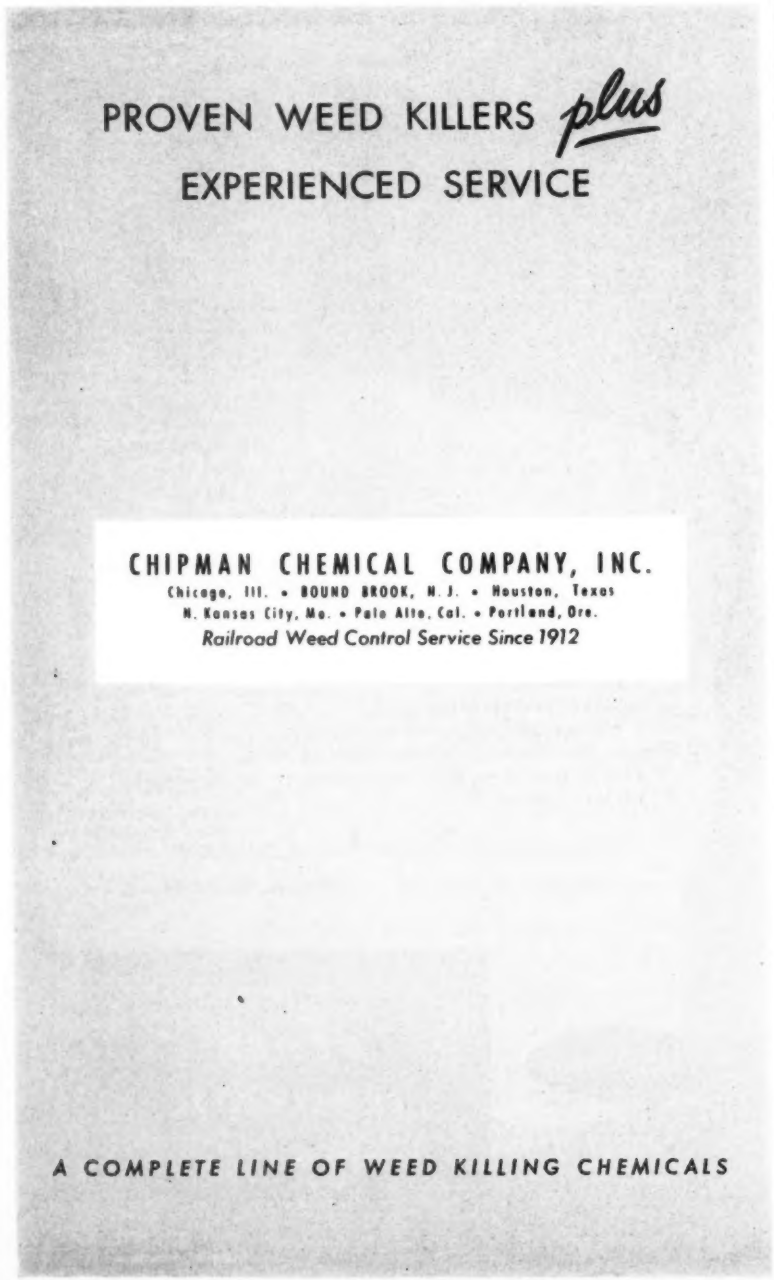
Obituary

E. L. Haley, division engineer on the Chicago, Burlington & Quincy, at Casper, Wyo., died on March 14.

Martin Doyle, retired track supervisor on the Illinois Central died at the St. Lawrence hospital at Lansing, Mich., on Feb. 20.

W. H. Tool, retired bridge and building master of the Canadian National, St. Thomas, Ont., recently died at the age of 78. **E. C. Neville,** also a retried bridge and building master on this road, whose home was at Toronto, Ont., recently died at the age of 73.

W. J. Moynihan, former track supervisor on the Erie at Elmira, N. Y., who retired late last year, died on February 23, at the age of 53.


PROVEN WEED KILLERS plus
EXPERIENCED SERVICE
CHIPMAN CHEMICAL COMPANY, INC.
Chicago, Ill. • BOUND BROOK, N. J. • Houston, Texas
N. Kansas City, Mo. • Palo Alto, Cal. • Portland, Ore.
Railroad Weed Control Service Since 1912
A COMPLETE LINE OF WEED KILLING CHEMICALS

Association News

Bridge & Building Association

The Executive committee has scheduled a meeting to be held at the Engineers' club, Chicago, on July 17 to review the reports of the technical committees, and to make final plans for the annual convention, which is to be held at the Hotel Stevens, Chicago, September 18-20.

Wood-Preservers' Association

Railroad men took an active part in the forty-sixth annual convention, which was held at the Rice hotel, Houston, Tex., April 25-27. With 515 members and guests in attendance the meeting involved the presentation and consideration of 32 committee reports and 17 addresses, many of direct or indirect interest to railroad men, a large number of whom were present in the capacities of both timber treaters and user of treated timber. Presiding as president of the association was J. S. Giddings, assistant man-

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 13-15, 1951, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—E. C. Gunther, Secretary, 122 S. Michigan Avenue, Chicago 3.

Maintenance of Way Club of Chicago—E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Walter L. Turner, Jr., Secretary, 30 Church street, New York.

National Railway Appliance Association—R. B. Fisher, Secretary; Lewis Thomas, assistant, Secretary 59 E. Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting, August 28-30, 1950, Brown Hotel, Louisville, Ky., Roy M. Edmonds, Secretary-treasurer, 610 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago, 5.

ager, treating plants, Atchison, Topeka & Santa Fe.

Two papers read at the meeting were of particular interest to railroad men. In one of these H. J. McKenzie, chief engineer, Texas & New Orleans (Southern Pacific Lines in Texas & Louisiana), Houston, Tex., described the experiences of his road with pile trestles involving "packed - chord" construction. Mr. McKenzie's remarks are reproduced elsewhere in this issue. The other of these two papers was read by W. J. Burton, assistant to chief engineer, Missouri Pacific, St. Louis, Mo. and was entitled "Treated Wood on the Missouri Pacific Railroad." Mr. Burton related the history of timber preservation on the Missouri Pacific, and estimated that the road's practice of treating crossties resulted in a saving of $2,599,465 in 1948 as compared with the costs that would have prevailed if the road were still using untreated ties.

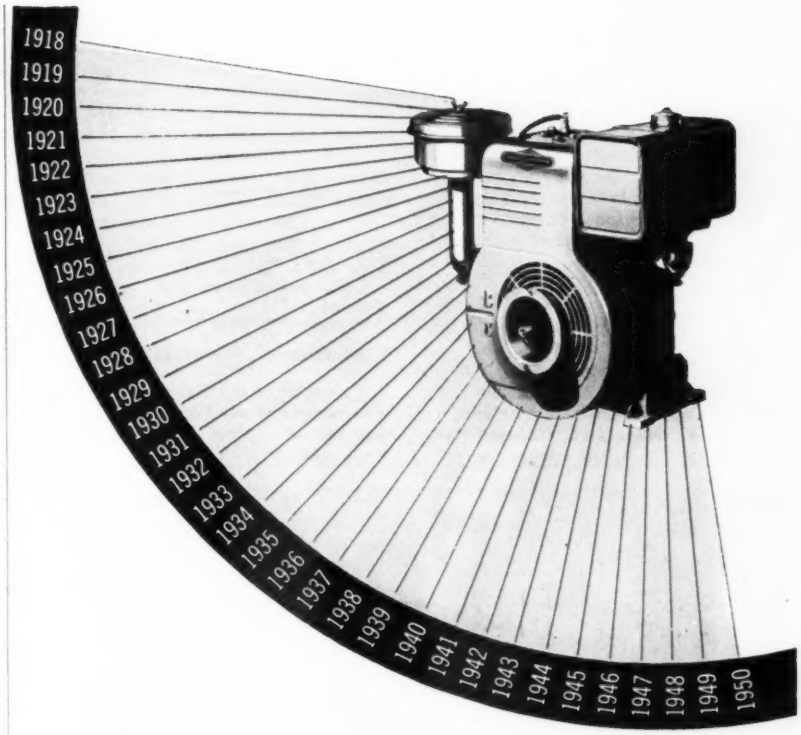
In the election of officers, F. W. Gottschalk, technical director, American Lumber & Treating Co., Chicago, was advanced from first vice-president to president; W. R. Yeager, inspection engineer, Western Electric Company, New York, was moved up from second vice-president to first vice-president; R. H. Beschter, manager, technical department, Koppers Company, Orrville, Ohio was elected second vice-president; H. L. Dawson was re-elected secretary-treasurer; and the following were elected to the Executive committee—G. B. Campbell, tie and timber agent, Missouri Pacific, St. Louis, Mo., and J. F. Renfro, vice-president Taylor-Colquitt Company, Spartanburg S. C.

American Railway Engineering Association

Members of the association are now voting by letter ballot on a number of constitutional amendments that have been proposed by the Board of Direction as a result of the resignation, due to ill health, of President George L. Sitton, assistant chief engineer of the Southern. The proposed amendments are designed to make it possible, in the event a vacancy occurs in the office of the president, for the senior vice-president, immediately and automatically, to become president for the unexpired term. Likewise, they provide for the immediate and automatic succession of the junior vice-president to senior vice-president in the event of a vacancy in the office of senior vice-president, and for the immediate filling of vacancies in the office of junior vice-president and on the Board of Direction by action of that body. In the same letter ballot the members are also voting on changes in those provisions of the constitution governing the place of meeting and the manner of setting convention dates.

At a meeting of the Board of Direction held on March 13 a special committee was created, consisting of the chairmen

(Continued on page 582)



32 Years of "Air-Cooled" Power

EXPERIENCE

in Building More than 4½ Million Engines

Briggs & Stratton engines have, by far, more air-cooled power experience built into them than any other single-cylinder, 4-cycle, air-cooled engines.

BRIGGS & STRATTON CORPORATION
Milwaukee 1, Wis., U. S. A.

4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

Powered Power FOR INDUSTRIAL CONSTRUCTION RAILROAD AND FARM EQUIPMENT

World Wide FACTORY SUPERVISED SERVICE

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

of the Committees on Economics of Railway Labor, Rail and Track, to determine the best means of undertaking a study of all phases of continuous welded rail. Two meetings have been held by this committee, the latest on May 17. As a result of the latter meeting definite recommendations have been made to the Board of Direction regarding machinery for progressing a study of continuous rail.

At the time of going to press nine standing committees had scheduled meetings to be held in June, as follows: Buildings, June 1 and 2 at the Statler hotel, Buffalo, N. Y.; Water Service and Sanitation, Engineers' club, Chicago, June 6; Wood Bridges and Trestles, Purdue university, Lafayette, Ind., June 5 and 6; Ties, June 6 to 9, when plants at Laramie, Wyo., Salida, Colo., and Denver will be visited to observe railroad inspected ties; Yards and Terminals, President hotel, Kansas City, Mo., June 12 and 13; Masonry, Fort Shelby hotel, Detroit, Mich., June 13 and 14; Records and Accounts, Hilton hotel, El Paso, Tex., June 14 and 15; Economics of Railway Location and Operation, Muehlebach hotel, Kansas City, Mo., June 21 and 22; and Highways, St. Paul, Minn., June 21 and 22.

Roadmasters' Association

A meeting of the Executive committee is to be held at the Engineers' club, Chicago on July 10, at which the principal activity will be to review the reports of the technical committees that are being prepared for submission at the annual convention to be held at the Hotel Stevens, Chicago, September 18-20. Another important item on the agenda of the Executive committee meeting is the making of final plans for the convention.

Track Supply Association; B. & B. Supply Men's Association

Detailed plans are rapidly taking shape for the joint exhibit of manufacturers' products that is to be held by these two associations during the concurrent annual conventions to be held at Chicago, September 18-20, of the Roadmasters' Association and the American Railway Bridge and Building Association. To date 104 manufacturers of materials, equipment and appliances used in the construction and maintenance of railway tracks and structures have contracted to occupy a total of 230 booths at the exhibit, which will be held at the Coliseum.

This exhibit, which will be the largest ever to be held by these two associations, is expected to be of special interest for a number of reasons. One is that many new products will be on display that have been developed since the last exhibit of this character was held in March, 1949. Furthermore, there will not be another opportunity to see so many products on display at one time until March, 1952. With exhibit space still available additional companies wishing to take part should address their requests to Lewis Thomas, Director of Exhibits, 59 E. Van Buren Street, Chicago. Following is a list of the companies that have already contracted for space at the exhibit:

Achuff Railway Supply Company, St. Louis, Mo
Air Reduction Sales Company, New York
Allied Chemical & Dye Corp., General Chemical Division, New York
American Brake Shoe Company, Ramapo Ajax Division, Chicago
American Hoist & Derrick Co., St. Paul, Minn.
American Lumber & Treating Co., Chicago
American Structural Products Company, Toledo, Ohio
Armco Drainage & Metal Products, Inc., Middletown, Ohio
Austin-Western Company, Aurora, Ill.
Barco Manufacturing Company, Chicago
Bernuth, Lembcke Company, Inc., Pittsburgh, Pa.
Bird & Son, Inc., East Walpole, Mass.
Branson Instruments, Inc., Stamford, Conn.
Brice Hayes Company, Chicago
The Buda Company, Harvey, Ill.
F. Burkart Manufacturing Company, St. Louis, Mo.
Caterpillar Tractor Company, Peoria, Ill.
Chain Belt Company, Milwaukee, Wis.
Chicago Pneumatic Tool Company, Chicago
Chipman Chemical Company, Inc., Bound Brook, N. J.
Cullen-Friestedt Company, Chicago
Davey Compressor Company, Kent, Ohio
Dearborn Chemical Company, Chicago
The Duff-Norton Manufacturing Company, Pittsburgh, Pa.
Eaton Manufacturing Company, Massillion, Ohio
Electric Tamper & Equipment Co., Ludington, Mich.
Fabreeka Products Company, Boston, Mass.

RAIN OR SHINE THESE UMBRELLAS STAY UP

CASE HISTORY SOUTHERN PACIFIC LINES

THESE UMBRELLA SHEDS at the Houston, Texas, passenger station of the Southern Pacific Lines have been sixteen years in service. The roof decking is constructed of WOLMANIZED pressure-treated lumber (150,000 board feet . . . 2 x 6 tongue and grooved dimension). Despite exposure to the weather and resulting decay the treated wood remains as sound today as it was when first installed in 1934. In addition to durability WOLMANIZED lumber has cleanliness and paintability which are so important for good appearance, especially in a passenger station. In these sheds aluminum paint has been used to keep the roof under-surface bright and clean.

SERVICE RECORDS, the only reliable gage of testing wood preservatives, have been kept on WOLMANIZED treated materials for 25 years. Case histories are available on more than 34,000,000 feet used in the United States during this period. For a copy of the "Service Record" booklet write to address below.

American Lumber & Treating Co.
1692 McCormick Building • Chicago 4, Illinois

WOLMANIZED PRESSURE TREATED LUMBER

Fairbanks, Morse & Co., Chicago
Fairmont Railway Motors, Inc., Fairmont, Minn.
G. & H. Rail Controls, Inc., Kansas City, Mo.
Gary Slag Corporation, Chicago
Genrall Motors Corporation, Detroit Diesel Engine Division, Detroit, Mich.
A. J. Gerrard & Co., Melrose Park, Ill.
Gravely Motor Plow & Cultivator Co., Dunbar, W. Va.
Hayes Track Appliance Company, Richmond, Ind.
Homelite Corporation, Port Chester, N.Y.
Hubbard & Co., Tool Division, Pittsburgh, Pa.
Illinois Mallable Iron Company, Chicago
Industrial Brownhoist Corporation, Chicago
Ingersoll-Rand Company, New York
International Harvester Company, Chicago
Johns-Manville Sales Corporation, New York
O. F. Jordan Company, East Chicago, Ind.
The Joyce-Cridland Company, Dayton, Ohio
Kalamazoo Manufacturing Company, Kalamazoo, Mich.
Kershaw Manufacturing Company, Montgomery, Ala.
Koehring Company, Milwaukee, Wis.
Koppers Company, Inc., Pittsburgh, Pa.
The Lehon Company, Chicago
Le Roi Company, Chicago
Link Belt Speeder Corporation, Chicago
The Locomotive Finished Material Company, Atchison, Kan.
Maintenance Equipment Company, Chicago
Mall Toll Company, Chicago
Massey Concrete Products Company, Chicago
The Master Builders Company, Cleveland, Ohio
Matisa Equipment Corporation, Chicago
The Midland Company, South Milwaukee, Wis.
Mid-West Forging & Manufacturing Co., Chicago
Modern Railroads Publishing Company, Chicago
National Lead Company, New York
The National Lock Washer Company, Newark, N. J.
Nordberg Manufacturing Company, Milwaukee, Wis.
Northwestern Motor Company, Eau Claire, Wis.
The Oliver Corporation, Industrial Division, Cleveland, Ohio
Oliver Iron & Steel Corp., Pittsburgh, Pa.
D. W. Onan & Sons, Inc., Minneapolis, Minn..
The Oxweld Railroad Service Company, Chicago
The P. & M. Co., Chicago
Permacrete Products Corporation, Columbus, Ohio
Pettibone Mulliken Corporation, Chicago
Pocket List of Railroad Officials, New York
Pullman-Standard Car Manufacturing Company, Chicago
The Q & C Co., New York
The Railis Company, New Haven, Conn.
Railway Engineering & Maintenance, Chicago
Railway Maintenance Corporation, Pittsburgh, Pa.
Railway Purchases and Stores, Chicago
Railway Track-work Company, Philadelphia, Pa.
Reade Manufacturing Company, Inc., Jersey City, N. J.
Racine Tool & Machine Co., Racine, Wis.
The Rails Company, New Haven, Conn.
Railway Ballast Conditioning Corporation, Minneapolis, Minn.
Rust-Oleum Corporation, Evanston, Ill.
Safety First Shoe Company, Holliston, Mass.
Schramm, Inc., West Chester, Pa.
Sperry Products, Inc., Danbury, Conn.
Taylor-Colquitt Company, Spartanburg, S. C.
Teleweld, Inc., Chicago
Templeton, Kenly & Co., Chicago
The Texas Company, Chicago
Thornley Railway Machine Company, Joliet, Ill.
Timber Engineering Company, Washington, D. C.,
True Temper Corporation, Cleveland, Ohio
Unit Crane & Shovel Corp., Milwaukee, Wis.
Warren Tool Corporation, Chicago
Wayer Impactor, Inc., Wayer Impactor Sales Company, Columbus, Ohio
Wheel Checkers, Denver, Colo.
White Manufacturing Company, Elkhart, Ind.
Whiting Corporation, Harvey, Ill.
Wisconsin Motor Corporation, Milwaukee, Wis.
Woodings-Verona Tool Works, Chicago
Woolery Machine Company, Minneapolis, Minn.
Young & Greenawalt Co., East Chicago, Ind.

Supply Trade News

General

The **Pressed Steel Car Company, Inc.,** 25 Broad street, New York, has been appointed eastern sales representative of the **Woolery Machine Company,** Minneapolis, Minn.

D. W. Onan & Sons, Inc., Minneapolis, Minn., has appointed the **Nelson Equipment Company,** Portland, Ore., as the Onan distributor in Oregon and several counties in Idaho.

Personal

Walter H. Bramman has joined the sales force of the **Black & Decker Manufacturing Co.** He will have his headquarters in Spokane, Wash., and will cover the eastern part of Washington, all of Montana and all of Idaho east of Boise.

Eugene C. Bauer has been elected first vice-president of **Poor & Co.,** Chicago. Mr. Bauer, who has held the position of

Protect Timber Bridges and Trestles From Grass and Weed Fires...Use

BORASCU®

...the Concentrated Borate Ore

FOR EFFECTIVE WEED CONTROL

Do away with fire-hazardous weeds and grasses about timber bridges and trestles, tie piles and buildings the thrifty, modern way . . . with BORASCU! Eliminate costly, labor-consuming, shovel-cutting operations too by using safe, non-corrosive, and economical BORASCU . . . the low-priced concentrated borate ore.

BORASCU is the ideal chemical because it is non-selective and destroys most all vegetation. When correctly used, BORASCU should prevent the growth of vegetation for 12 to 24 months, or longer. BORASCU is applied dry, just as it comes from the convenient, easily disposable, 100-lb. bags. Your section hands can apply BORASCU, without tieing up tracks and equipment, by following simple directions. A common 12-quart pail and BORASCU are all that is required to eliminate weeds and grasses.

● *Start your economy in weed control now . . . write at once for your copy of the latest Borascu bulletin containing full information and address of our Weed Control Field Office nearest to you.*

PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED

510 WEST SIXTH STREET • LOS ANGELES 14, CALIFORNIA

Supply Trade News (Cont'd)

vice-president of the company, continues as president of the **Kensington Steel Company,** Chicago, one of the principal subsidiaries of Poor & Co.

W. A. Roberts, executive vice-president of the **Allis-Chalmers Manufacturing Company,** has announced the appointment of **Floyd J. Mischke** as export manager of the company's Tractor division. Mr. Mischke succeeds **M. J. Proud,** who died on April 16.

H. M. McFarlane, president of the National Railway Appliances Association, has joined the sales force of the **Cullen-Friestedt Company,** Chicago, manufacturer of "Burro" cranes. Mr. McFarlane formerly directed sales for the O. F. Jordan Company, East Chicago, Ind. He is a past president of the Track Supply Association.

William P. Gillespie, manager of the Market Requirements department of **Henry Disston & Sons, Inc.,** has been named manager of chain saw sales, with headquarters at Philadelphia, Pa. He succeeds **Ellwood J. Gebhart,** who has been assigned to a key research and development post at the factory of the company in Philadelphia.

The **Chain Belt Company** has announced the appointment of **Marshall E. Cusic** as district sales engineer, with headquarters at Pittsburgh, Pa.

H. C. Ramsey, president of the **Worthington Pump & Machinery Corp.,** has announced the appointments of **Walter H. Feldman** as vice-president in charge of sales; **John J. Summersby** as vice-president in charge of purchases; **Frederick W. Thomas** as general manager of purchases and **Carleton Reynell** as general representative, sales and purchasing departments.

The **Hyster Company** has appointed two new district managers of lift truck, turret truck, straddle truck and mobile crane sales. **D. Stearns** will handle sales in Pennsylvania, New Jersey, Virginia, West Virginia and the District of Columbia, while **W. M. Costley** will be in charge of the territory comprising Minnesota, Wisconsin, northern Illinois, Iowa, eastern Nebraska, North and South Dakota, and eastern Montana. Mr. Costley formerly was regional sales supervisor in the Chicago area for the Clark Equipment Company.

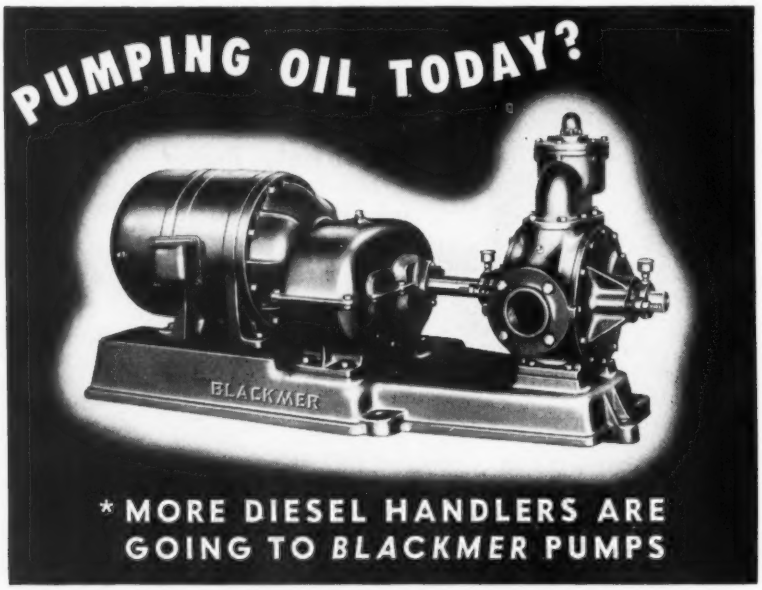
Thomas H. Smith has been appointed assistant vice-president in charge of railroad sales for the **Rust-Oleum Corporation,** with headquarters in New York. He

Thomas H. Smith

will assist the firm's railroad representatives in the eastern region of the United States. Mr. Smith began his business career in 1941 with the Hallen Welding Company. In 1942 he enlisted with the U.S. Army Combat Engineers and after his discharge in 1945, joined the freight traffic department of the Pennsylvania. He has been a sales representative for the Collins Oil & Manufacturing Co. for the past two years.

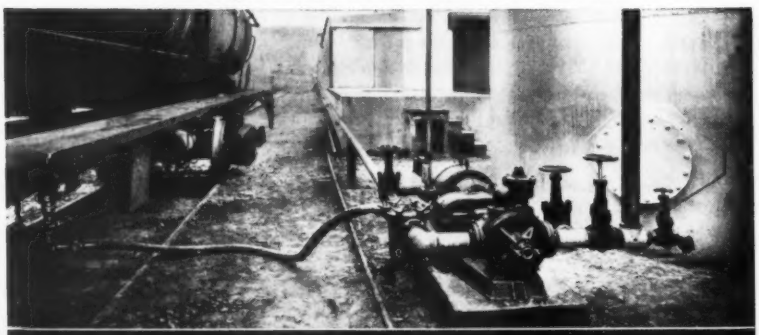
The **Dearborn Chemical Company** has announced the addition of 12 new representatives to its sales and service staff, assigned to the following territories, with headquarters as indicated: **T. Armstrong,** west Texas and New Mexico, at Amarillo, Tex.; **R. W. Bartlett,** New England, at Boston, Mass.; **C. P. Blakeley,** New Jersey, at New York; **T. Bull,** northern California, at San Francisco; **J. W. Fisher,** eastern Ohio, at Cleveland; **R. E. Johnson,** northern part of Chicago; **W. J. Mercier,** southern Wisconsin, at Milwaukee; **R. T. Moran,** part of Michigan,

(Continued on page 586)



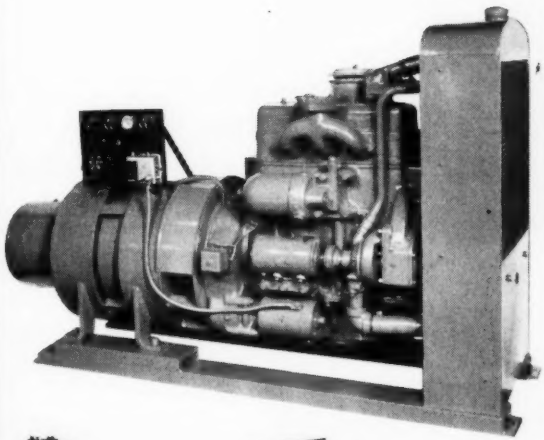
Railroads, petroleum marketers, industries and power plants install Blackmer Pumps and forget them. Many installations of 20 years or more daily service have had no maintenance except lubrication. These Blackmer Pumps, long "written off," are still on Blackmer records for "service" if parts are ever needed. Blackmer Pumps with capacities from 5 to 1500 G.P.M. for petroleum products and industrial liquids are "self-adjusting for wear." Users learn pumping costs are lower with Blackmer Rotary Pumps. In 1950, since 1905, Blackmer Pump users will show favorable cost reports.

Read Why: Write For Bulletin 307—"FACTS"



BLACKMER PUMP COMPANY – GRAND RAPIDS, MICHIGAN

Just one repair in 10 years of use!



This kind of dependability cuts costs for railroads too!

A "US" 15-KW Diesel-driven Electric Plant has operated approximately 6500 hours in this garage in Hadley, Mass., without once having the head off. The *only* repair has been the replacing of a bolt in the coupling! Just one more proof that "US" simple design and rugged construction pay off! There's a "US" unit for every railroad use. Write for information.

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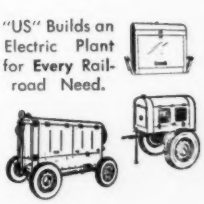

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

We control every step of their manufacture — from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

Their dependability has been proven **made especially for Railroad Service** by years of actual service on hundreds of railroads.

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140 Shamrock St., EAST ALTON, ILL.
SPECIALIST MANUFACTURERS OF SPRING WASHERS

BEALL Hi-Duty SPRING WASHERS

Supply Trade News (Cont'd)

at Kalamazoo; **D. E. Pedginse**, northern Indiana, at South Bend, and **H. O. Scott**, central Ohio, at Dayton. Assigned to Dearborn's technical department in Chicago are **V. P. Nobile**, as assistant to the manager of the industrial water treatment department, and **K. W. Franks**, as assistant to the technical director of the railroad department.

W. E. Bossert has been appointed New York district sales manager for the **Alan Wood Steel Company**, Conshohocken, Pa., to succeed **W. H. Dickson** who has retired voluntarily after 41 years of continuous service. Mr. Bossert joined Alan Wood in July 1910, and except for serving in World War I and with the War Production Board from July, 1942, to October 1944, his association with the company has been continuous.

R. P. Jackson, vice-president of the Wood Preserving division of **Koppers Company, Inc.**, whose appointment also as Chicago district manager was reported in the April issue, is a native of Detroit, Mich. He received his education in that city, specializing in business administration and accounting. He joined Koppers in 1918 as a traveling auditor and chief clerk for Koppers Construction Company (subsidiary of Koppers Company). Following service as chief accountant for another Koppers subsidiary in 1931 he became assistant

R. P. Jackson

treasurer of the Ayer and Lord division of Koppers (now part of the wood preserving division). Mr. Jackson has served as a vice-president since 1935.

Obituary

Francis I. Kemp, manager of the Vertical Turbine Pump division of the Worthington Pump & Machinery Corp., died on April 14.

Walter F. Healy, manager of railway sales for the Union Metal Manufacturing Company, Canton, Ohio, died on April 18, in Indianapolis, Ind. He was 59 years old.

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Only
Burro Cranes Have:

- Fast travel speeds—up to 22 M.P.H.
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Burro WORK Power means more EARNING Power

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Trade Publications

(To obtain copies of any of the publications mentioned in this column, use postcards, page 519)

Orton Pile Driver—The Orton Crane & Shovel Co., has issued a four-page bulletin on the Orton B3 pile driver—a self-contained, revolving, locomotive-type unit equipped with a horizontal truss and collapsing leads.

Caterpillar Products—A 36-page booklet has been published by the Caterpillar Tractor Company, describing, with illustrations and specifications, the complete line of Caterpillar equipment, including several new machines which have recently been added.

Controlling Ground Water—Armco Drainage & Metal Products, Inc., has published a 24-page illustrated booklet on the use of Armco perforated pipe for controlling ground water. Following a discussion of the primary advantages of perforated pipe—structural strength, resistance to impact, strong joints, controlled infiltration area, and economical installation—the booklet gives the recommended methods of installation.

Yard-Cleaning Machine—The Pettibone Mulliken Corporation, Chicago, has published a 28-page booklet describing its new Model 56 Speed Loader Trak-Kleener—an off-track machine designed for removing debris from yard tracks. In addition to a complete description of the machine, with drawings and specifications, the booklet presents a picture story of two tests of the machine, one undertaken to determine how fast and thoroughly the unit would clean tracks between the rails and the other to determine the same information for between-track areas.

International Crawler Tractors—Performance-boosting and cost-cutting features of International crawler tractors are graphically presented in two new folders issued by the International Harvester Company. One of these, entitled "Is Your Horsepower Going to the Track" explains the direct transmission-to-track power train of typical International tractors. The other folder entitled "How Long Is Your Tractor's Life Line?" describes the function of the front stabilizer in preventing misalignment and in minimizing leverage loads.

Finding Rail Defects Within Joint-Bar Limits—Inspection of rail at the joint and at switches, frogs and crossings for bolt hole cracks and head-and-web separations, using ultrasonic detector cars, is described in Bulletin 02-105, published by Sperry Rail Service, division of Sperry Products, Inc., Danbury, Conn. The new service is offered separately from the standard rail testing service using Sperry induction detector cars for testing rail in track outside the joint bars. Details of the combined use of both services, providing complete end-to-end testing of rails in track, may be had by addressng Sperry Rail Service for Bulletin 02-105 or for further information.

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Fire attacks Great Western freight trestle

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From main line to shunting trestle, every open-deck timber bridge presents its own fire hazard. Brake shoe sparks, lighted cigarettes tossed by careless smokers, drippings of molten metal from over-heated shoes, oil, coal, and other fuel dropped from locomotive boxes . . . all these elements find a hungry target in unprotected surfaces where ordinary coatings have worn down and cracked to expose splintered wood.

Leading Railroads* are now restricting fires with the LIBBEY-ZONE PROCESS using Heavy-Duty Coating . . . the revolutionary scientific discovery that combines genuine Canadian ASBESTOS FIBRE with intensified elastic ASPHALT GUM to produce a LONG-LASTING, ECONOMICAL, GENUINELY FIRE-RETARDANT SURFACE for open-deck bridges and trestles.

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*Names of Railroads upon application.

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Check your work schedule. See all the jobs you can assign to a TRAXCAVATOR. Then see your TRACKSON-"Caterpillar" Dealer for aid in selecting the TRAXCAVATOR model, from the five available, that can best do your job or write to TRACKSON COMPANY, Dept., RE-60, Milwaukee 1, Wisconsin, for more details.

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The *ORIGINAL* Tractor Excavator

SAVES
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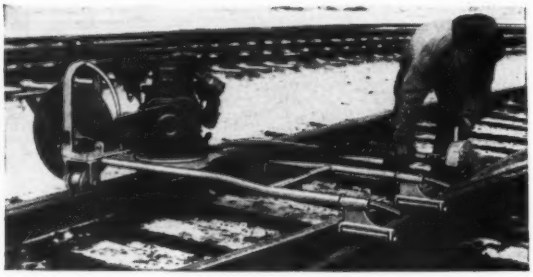

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Speed . . . Power . . . Economy . . . work hand in hand with your track gang when you equip them with a P-44 Track Grinder. Look at these many advantages:

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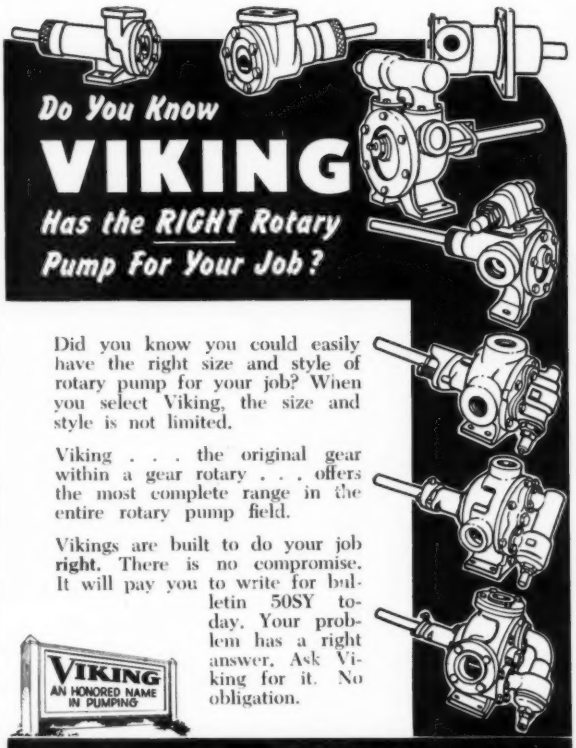

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VERTICAL TURBINE PUMPS

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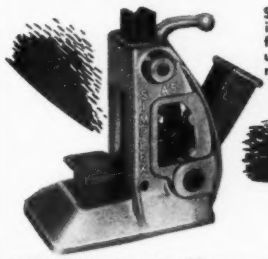

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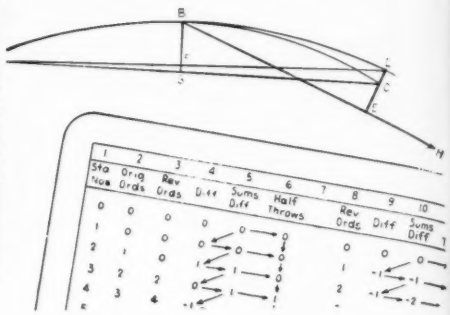

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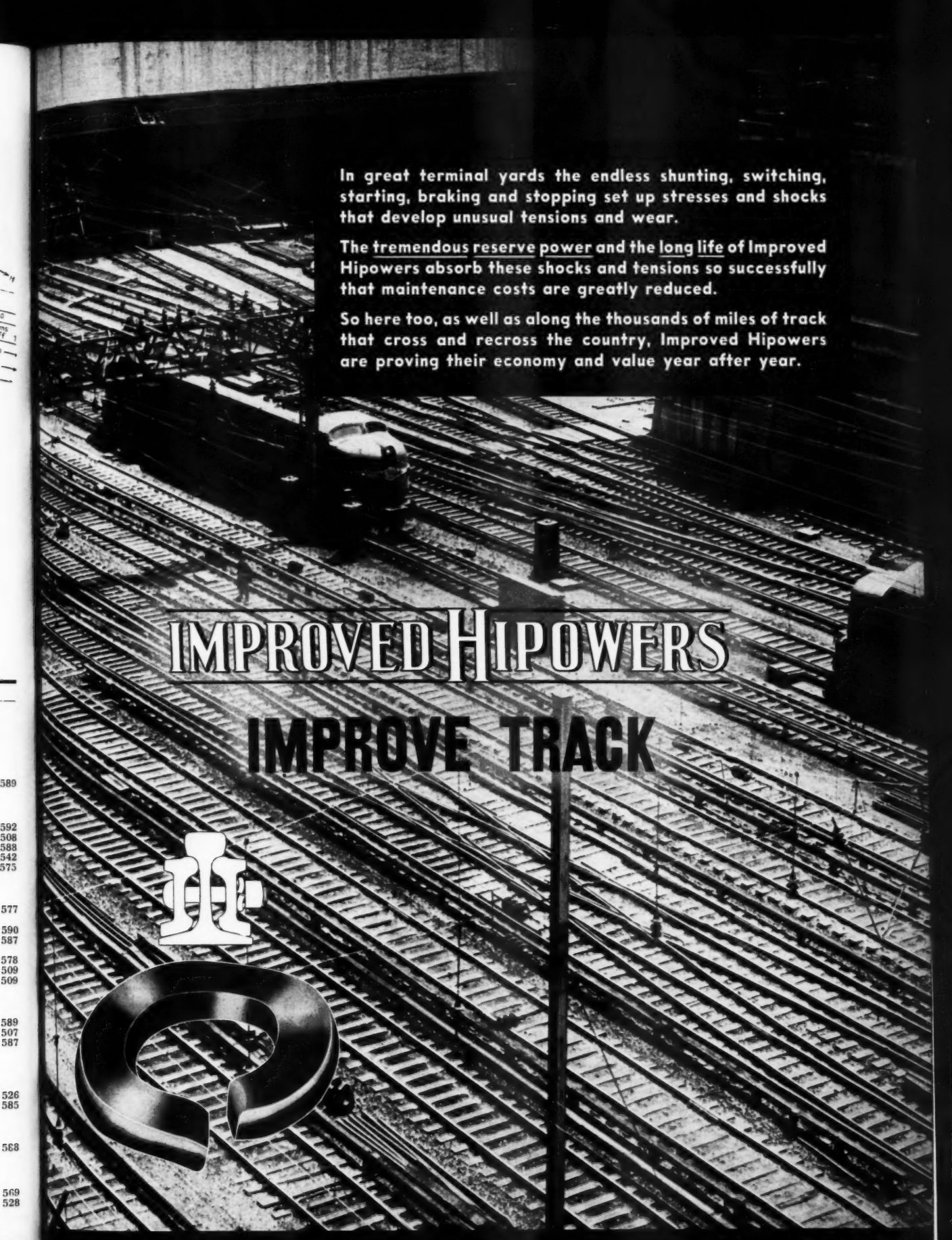
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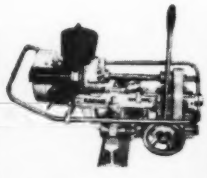

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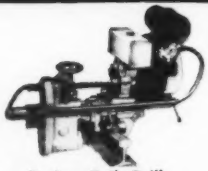
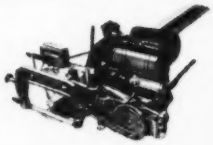


Racine Rail Drill



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